Vol. XXIX OCTOBER 1935 Number 10

EXCAVATING ENGINEER

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D I E S E L

The "Caterpillar" Diesel Seventy-five Tractor and "Caterpillar" Grader—an unbeatable team for road construction at lowest possible cost. Here it is banking a grade on a highway near Joplin, Mo.

122

WATCH a modern Bucyrus-Erie dig . . . notice the sureness with which the dipper holds the grade, the freedom with which it is safely dropped into the pit, the swift thrust through the bank, the invariable heaped load, the quick acceleration of the swing, the sharp stop over the truck and the quick dump. You can't get speed like that without accurate, effortless control . . . and Bucyrus-Eries have it to a superlative degree.

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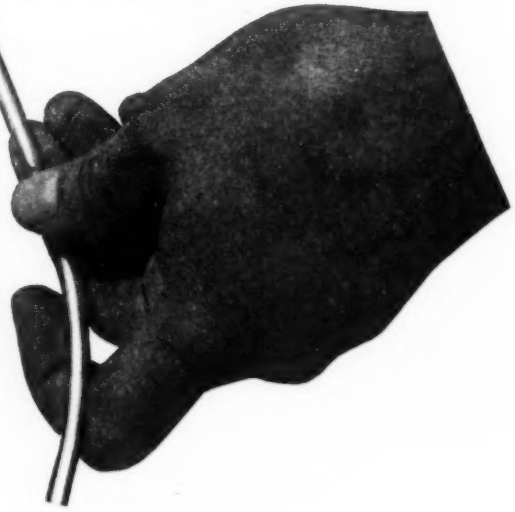

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PUBLISHED MONTHLY
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EXCAVATING ENGINEER

DEVOTED EXCLUSIVELY
TO EXCAVATION

About Excavating Projects — By Excavating Men — For Excavating Men — The World Over

Vol. 29 OCTOBER, 1935 No. 10

Contents

Mining Anthracite Coal ..... **Front Cover**

Electric- and Diesel-powered excavators aid materially in reducing mining costs in the production of hard coal.

Digging Through Indiana's Limestone Hills, by Jack Wills **465**

A relocation project near Bedford eliminates several sharp curves and steep grades. Calumet Paving Company excavates 187,000 yards of dirt and rock with a Bucyrus-Erie 3½-B Diesel shovel.

New Shovel Cuts Costs—and Puts More Men to Work, by Lloyd S. Graham **469**

Jefferson County (New York) Highway Department finds new 10-B shovel reduces excavating and hauling costs. Money saved is used to give employment to additional men.

Editorial **472**

The Business Situation 472
Cause and Effect 472

Field Notes **474**

Water Main Break Costly 474
Handy Babbitt Repair Kink 474
Economies of Dust Collecting Systems 474

Equipment You Ought to Know About **475**

Bucyrus-Erie Announce Fast 2½-yard Diesel 475
U. S. Super Air Hose 475
Heavy-Duty Welder 475

Shots from the Firing Line **476**

Sand and Gravel Output Up in 1934 476
National Gasoline Consumption Increases 476
Central Valley Project Under Way 476
Alaskan Highway Authorized by Congress 476
1934 Sand-and-Gravel Trophy Winners 476
Road Builders to Meet in Cleveland 478
Highway Labor Regulations Modified 478
Highway Research Board to Hold Annual Meeting 478
New England Notes 478
New York Notes 478
Ohio Notes 480
Michigan Notes 480
Illinois Notes 480
St. Louis and Vicinity 480
River Notes 480
Fort Peck Dam Notes 480
Montana Notes 482
Bonneville Dam Notes 482
California Notes 484
Colorado River Aqueduct Notes 484
Southern California Notes 486

Not in the Contract **487**

Florida Ship Canal Bids Opened Oct. 7 ..... **492**

Looking Ahead

These interesting articles will appear in early issues of Excavating Engineer. Watch for them!

Building Fort Peck Dam.

Dredging operations for the earth fill core, diversion tunnel construction, and the excavation for the spillway will be presented in a series of articles starting in an early issue.

Grade Separation Improves Approach to Delaware River Bridge.

Builders, Inc., construct 1400-foot underpass beneath new high-speed trolley tube in Philadelphia.

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Editor

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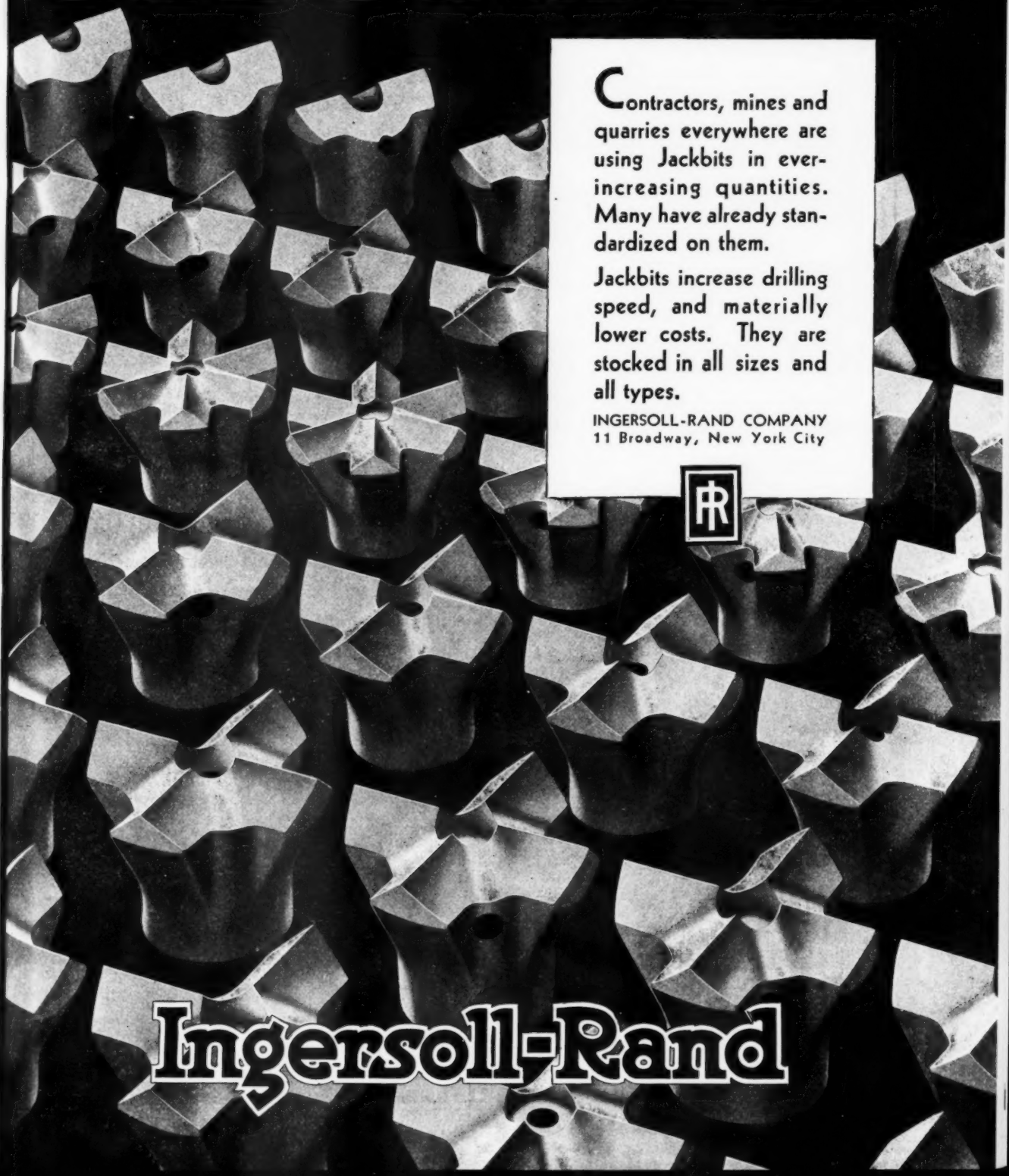

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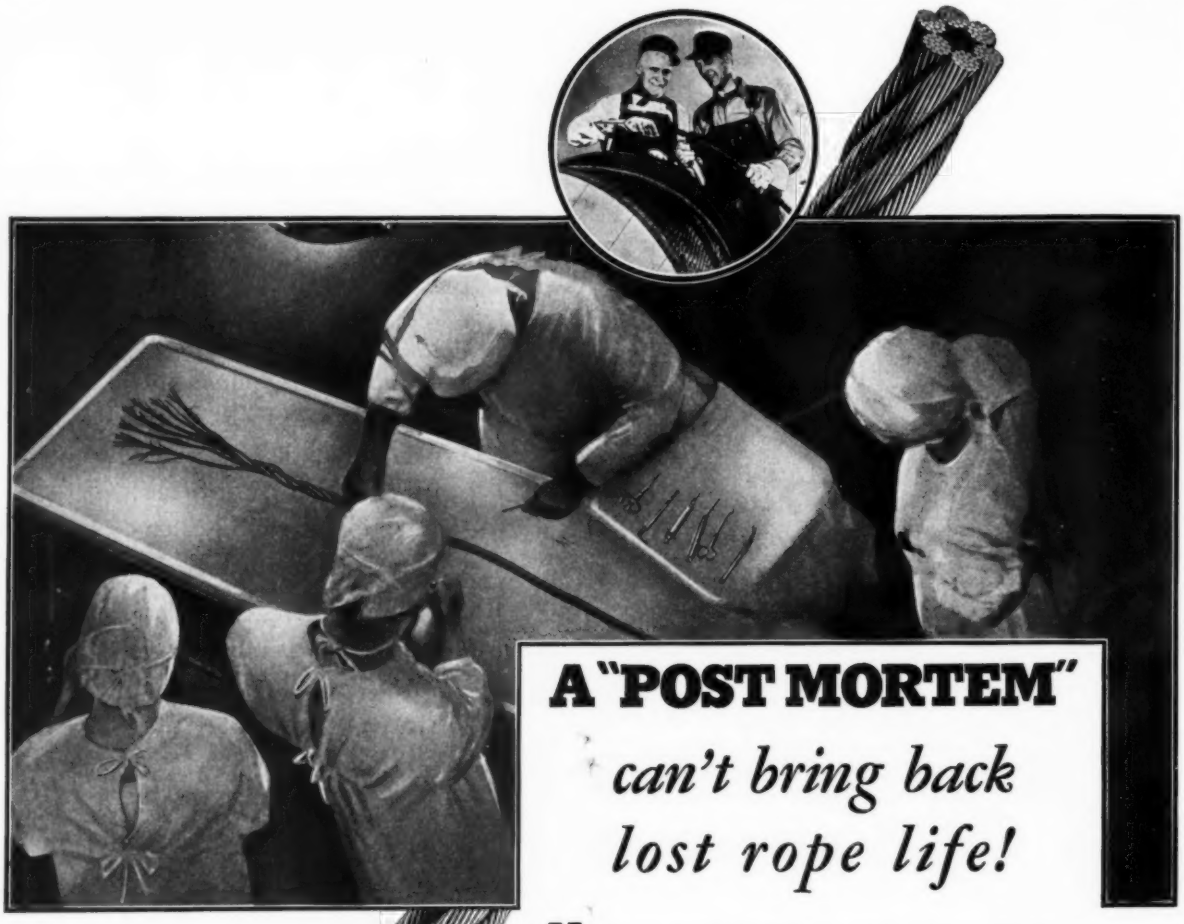

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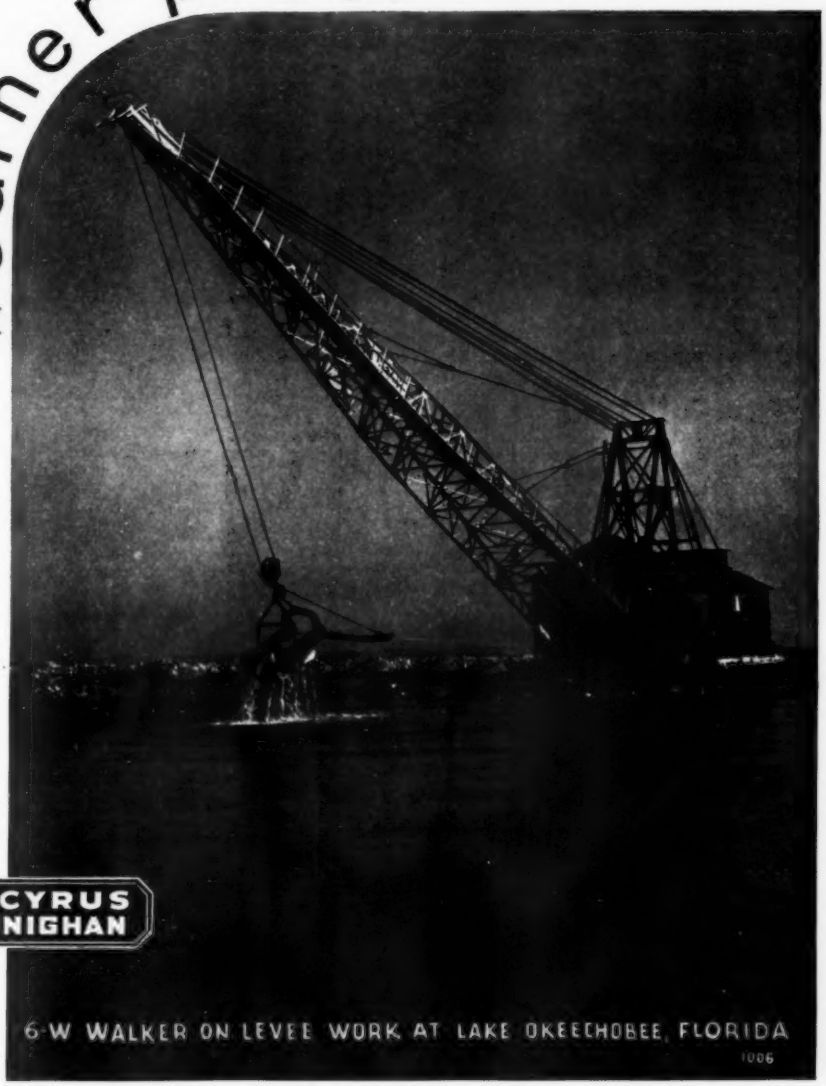

6-W WALKER ON LEVEE WORK AT LAKE OKEECHOBEE, FLORIDA

1006

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EXCAVATING, DRILLING, AND MATERIAL-HANDLING EQUIPMENT...SOUTH MILWAUKEE, WISCONSIN

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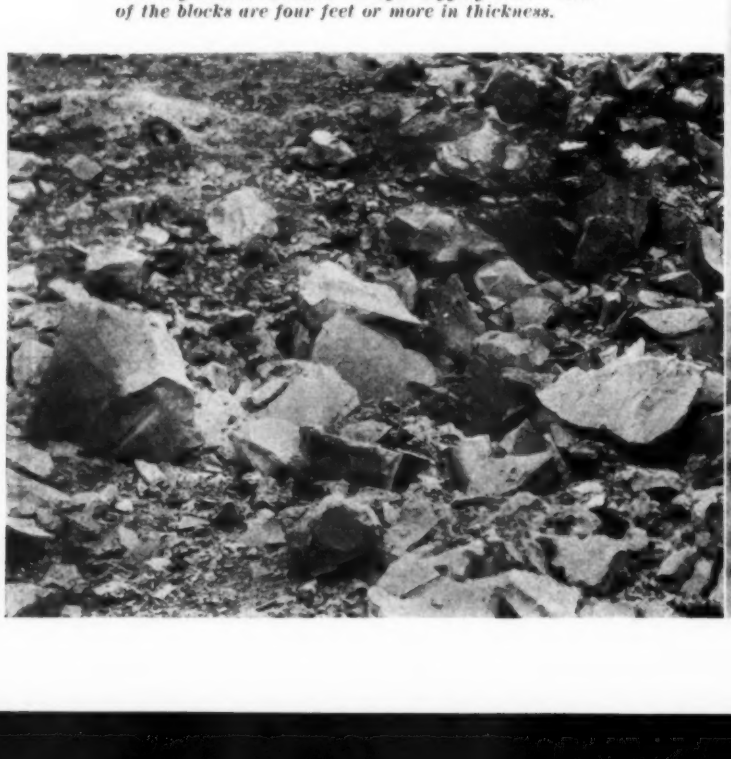
• *Above: More than 68,000 yards of rock were excavated on this 3.74-mile section on State Highway 37 north out of Bedford, Indiana. The new road is carved through hills of the famous Bedford limestone. The illustration here shows one of the heavier cuts encountered by the contractor—Calumet Paving Company. Right: A heavy blast of Silver Grain powder breaks up a limestone ledge. The contractor had to exercise unusual precaution while blasting to prevent the shattering effect of the explosive from being transmitted to neighboring deposits of good building stone. Below: Tough digging here—some of the blocks are four feet or more in thickness.*



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OCTOBER 1935
VOL. XXIX NO. 10

Digging Through Indiana's Limestone Hills

• *Getting down to rock. Limestone outcroppings make the digging more difficult.*

Calumet Paving Company moves 68,000 yards of limestone on relocation project near Bedford

By **JACK WILLS**

LAWRENCE COUNTY, in the south central part of Indiana, may well be called a county of stone. It is here the famous Bedford building stone is quarried. The terrain of the county is generally extremely hilly and heavily wooded, and only the narrow valleys are cultivated to any extent. Nearly every hillside shows outcroppings of the native limestone, around which is built the main industry of the community. While these hills of stone have long been sources of supply for the quarry operators, and have proved to be valuable assets to the residents of the county, on the other hand, these same hills have been obstacles in the pathway of the road builder.

Years ago, the first roads were little more than trails which, apparently aimlessly, wound their way through narrow valleys, twisting over incredibly steep inclines, always following the lines of least resistance. As the population of the county increased, these trails were improved somewhat to meet the requirements of the horse-and-buggy days. With the advent of the automobile, improvements, such as cutting down excessively steep grades and widening the road bed, were carried out by the county. But road building under such conditions was expensive, and the County Highway organization had to do the best it could in a small way with the money available.

Even after the State Highway Department took over certain of the main routes through Lawrence County there existed sections of roads through the hills which were far from meeting the requirements set up by modern traffic as to safety, use, and comfort.

One of the worst of these old sections, with an abundance of sharp curves, steep grades, narrow pavement and bumps was that stretch of Highway No. 37 extending north from Bedford to Oolitic in Lawrence County. South from Bedford and north from Oolitic, State Road No. 37 continued as a modern, well paved road.

Last year the Indiana State Highway Department included the improvement of this obsolete section in its road program, and, aided by funds allotted to the Department by the National Recovery Act, found it had the necessary money to carry the project through to completion.

187,000 Yards of Excavation

The opening of bids revealed that the successful contractor was the Calumet Paving Company of Gary, Indiana, whose bid was $239,951. The project, designated as NRHM 92A, called for a total of 4.1 miles of grading and paving, of which 3.74 miles was on State Road 37 north from the city limits of Bedford through the town of Oolitic to join that part of the Bedford-Bloomington Road which had been paved a

• *As the fills are built up, they are levelled off by this Caterpillar-drawn Ateco hydraulic dirt mover. To the right, another big load is brought to the fill in a Euclid wagon.*

number of years previously. The remainder, .35 miles of paving only, was on State Road 54 outside of Oolitic. According to the plans, the project involved: 68,000 yards of rock excavation; 68,000 yards common excavation; and 51,000 yards of special borrow. The plans specified a concrete slab 22 feet wide for most of the mileage, with an increase to 36 feet for a length of 1500 feet in Oolitic, and also 7,837 lineal feet of curbs and gutters.

Drilling and Blasting Procedure Specified by State

The State Highway Department specifications contained some stringent rules as to the manner in which the rock was to be drilled and blasted. Quite a bit of the improvement followed a new right of way, and it was thought that the contractor, in digging out some of the heavy cuts, would encounter good building stone. If blasting proceeded with the usual use of dynamite, the shattering effect of the explosive would reach the nearby quarries and very likely crack good usable stone. It is for this reason that the Bedford quarries remove their limestone without the use of explosives, even to the extent of taking off the cover rock by mechanical means. So the engineers specified in their contract that all blasting on this project had to be done with black powder, and that all good building stone, when encountered, had first to be loosened by horizontal drilling, then blasted into large blocks and reduced to a size suitable for handling. These operations were to be carried on under the supervision of a representative of the Indiana Limestone Company, the largest building stone producer in the county. As things turned out, no usable building stone was encountered during the excavating but nevertheless all blasting had to be done with black powder as specified.

• *Grading Inspector W. B. McGinnis and General Manager George Verplank talk things over.*

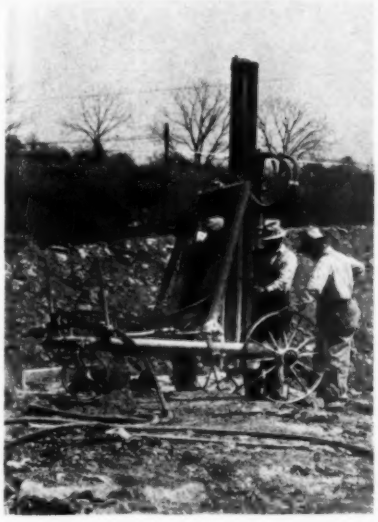
• *Superintendent Abe Verplank watches the shovel do its stuff in the heavy rock cut.*

The Calumet Paving Company received the award on October 8, 1934, and started work promptly. The clearing and grubbing on the right of way was done entirely by hand labor as required in the contract. The culvert work was sublet to Gradle Brothers, Hobart, Indiana. Of the eleven culverts built, ten were on the new right of way. Gradle Brothers were able to start work early and completed this part of the project in April. The box culverts were not very large and what excavation was required was performed by hand. The eleven culverts required 378 yards of concrete.

The town of Oolitic divided the job into north and south sections and served as headquarters for the entire operation. A road

building job which involves rebuilding on the old right of way usually means detours. But here there were no suitable detours available for the county roads were inadequate to carry state highway traffic during the winter months. So the contract prohibited detours until April 1, and after that date the contractor was allowed to block off one section only. He could close one, either the north or south section, but not both. Consequently the Calumet Paving Company, because of these detour limitations, was unable to work on the south section which contained a larger share of the work until April 1.

One of the features of the south section was a cut 3,000 feet



• *A Cleveland wagon drill sinks a series of holes in the limestone.*

in length with a maximum depth of 18 feet which involved 50,000 yards of rock and 5,000 yards of common excavation. The cut was started April 1 and completed June 25. The material from this cut was dumped in a fill 2,200 feet long with a maximum height of 20 feet. The specifications called for 42 feet width at the top with 2 to 1 side slopes. To complete this fill, in addition to using all of the 55,000 yards of material taken from the cut, it was necessary to obtain 35,000 yards more from a borrow pit. The fill was finished early in August.

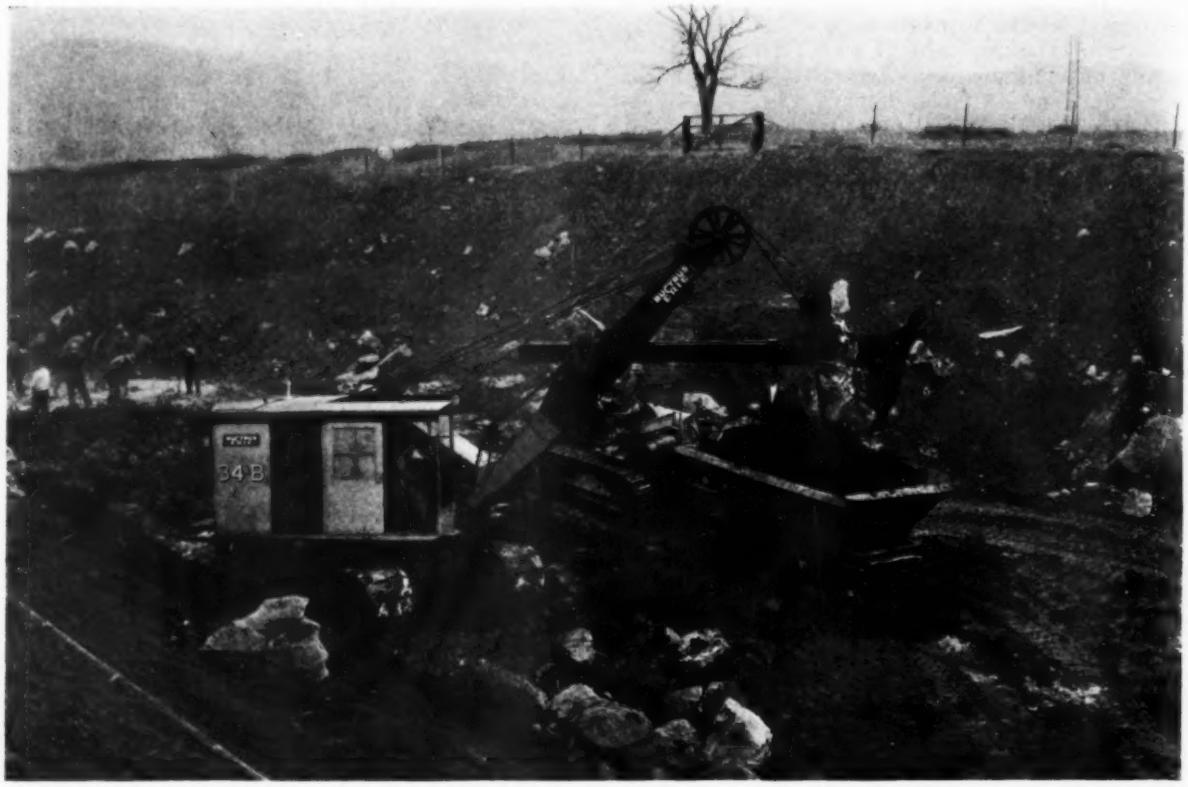
The common excavation on the new right of way and the stripping of rock cuts was handled with a one-yard gasoline-powered Northwest shovel which loaded to four Euclid 7- to 8-yard bottom-dump crawler wagons, pulled by Caterpillar tractors. At the fills, a Caterpillar-drawn Ateco hydraulic dirt-mover levelled off the material which was compacted by a Huber 10-ton roller.

• *Despite the mud, the shovel, powered with a Caterpillar Diesel engine, picks up a big dipperful of rock and dirt.*

Black Powder Used

The rock cuts required extensive drilling. The size of the drill gang varied with the character of the rock surface encountered. Drilling was done with Ingersoll-Rand, Cleveland, and Gardner-Denver jackhammers, and one Cleveland WR-6 wagon drill. From two to six jackhammers were used at all times, while the wagon drill was used only on fairly level rock benches. Ingersoll-Rand and Timken drill steel and jack bits were used. The holes were started at 2½ inches and decreased to 1½ with the depth. The drillers found that they got

• *A heavy cut and a long fill eliminates several dangerous curves and steep grades which made driving over the old road hazardous.*



• *The overburden in this cut is loaded and hauled away in Athey and Euclid tractor wagons. To the left of the shovel, the drill gang puts down blast holes with jackhammers.*

maximum efficiency if they did not let their drill holes exceed a depth of 12 feet. The deeper cuts were taken out in two lifts. Compressed air for operating the drills was furnished by three Ingersoll-Rand portable compressors, two of 240-foot and one of 120-foot capacity. As required by the specifications, the holes were loaded with black powder and fired by electric blasting caps. Various makes of powder were used at the start of the work until the Illinois Powder Manufacturing Company of St. Louis, Missouri, introduced their Silver Grain powder. This powder, entirely new in principle, was found to be more economical and efficient, and as a result was used throughout the major portion of the project. The general practice was to set off from 50 to 200 holes at a time, keeping the loads as light as possible to avoid the possibility of cracking neighboring deposits of building stone. On an average, 1.2 pounds of powder were required per yard of rock blasted.

The use of black powder as a blasting medium created a loading problem. The rocks would break out in sizes varying from small crushed stone up to pieces so large that one would fill a dump wagon. The various sized rocks were all intermingled so that the digging was extremely difficult. In fact many experienced dirt movers who visited the job said it was the toughest digging job they had ever seen.

The loading in the rock cuts was handled by a Bucyrus-Erie 34-B shovel powered with a Caterpillar Diesel engine. Two Athey 7- to 8-yard hydraulic two-way dump wagons and one Euclid 7- to 11-yard dump wagon were used on the rock hauling. Three Caterpillars, one of which was a Diesel 50, pulled the wagons. Another Caterpillar Diesel 50, equipped with a Euclid Bulldozer, worked on the rock after it had been placed in the fill and kept it levelled.

90,000 Yards in One Fill

The rock was placed in the fills by end dumping. The base of the 2,200-foot fill, previously mentioned, was made with one lift of rock which varied from 10 to 15 feet in height. The rock lift stopped five feet below the finished grade. The top was then broken up very fine and compacted by the roller before the special borrow dirt was placed over it to bring the fill to grade.

The batching plant for the concrete aggregate was set up along a siding on the Monon railroad at Oolitic. The materials arrived in gondola cars and were unloaded by the Northwest machine which had been converted to clamshell operation and carried a 1-yard Keisler clamshell bucket. Sand and gravel were loaded out through a Butler bin equipped with weighing batchers. Crushed stone was handled through a Johnson Bin, also equipped with weighing hoppers.

Cement was received in bulk, and was handled by a Heltzel cement plant set up on a spur of the Milwaukee Road in Oolitic. A power scoop pulled the cement out of the car into a chute leading to a bucket conveyor which elevated the cement to the storage bin. A large rotary valve controlled the flow of the cement into the weighing hopper. Each batch

(*Continued on page 488*)

New Shovel Cuts Costs—and Puts More Men to Work

● *One of the county's highways after it has been rebuilt. The center portion is ten feet wide with 3-foot shoulders on each side.*

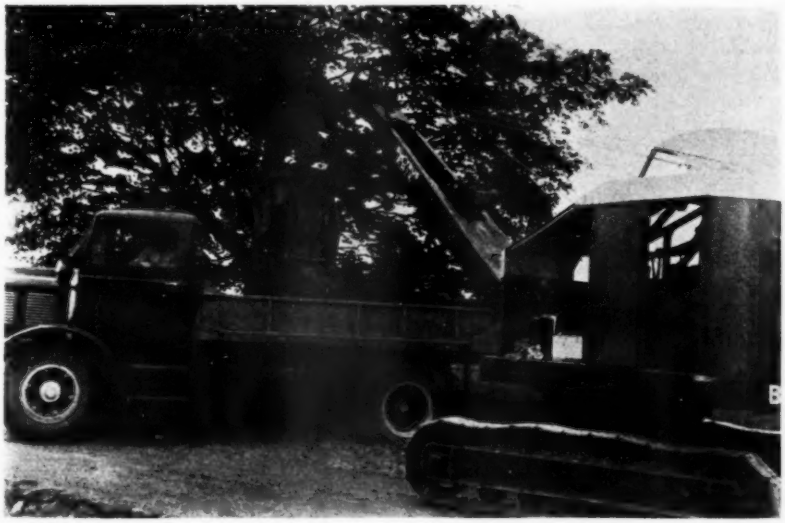
Jefferson County, New York, builds more roads and gives more employment since adding modern excavator to its equipment

By LLOYD S. GRAHAM

HAVE YOU EVER watched a three-ring circus—all of it—all at once? If you have, you may have wondered at the problems of the man managing those three rings. But after all, you reflect, it is merely a matter of having a liking for the circus business—and plenty of experience and knowledge. And the same may be said of Walter R. Eggleston, Superintendent of Highways of Jefferson County, New York; except that he has 22 rings—excuse us, townships—to keep an eye on instead of only three.

Jefferson County is located in northern New York in that portion of the state where the St. Lawrence River forms an outlet for the Great Lakes Basin. Indeed, this is the "Thousand Islands" region of the St. Lawrence, and most of the American islands are included in Jefferson County. Watertown is the county seat with a population of 30,000 and is located approximately in the geographical center of the county.

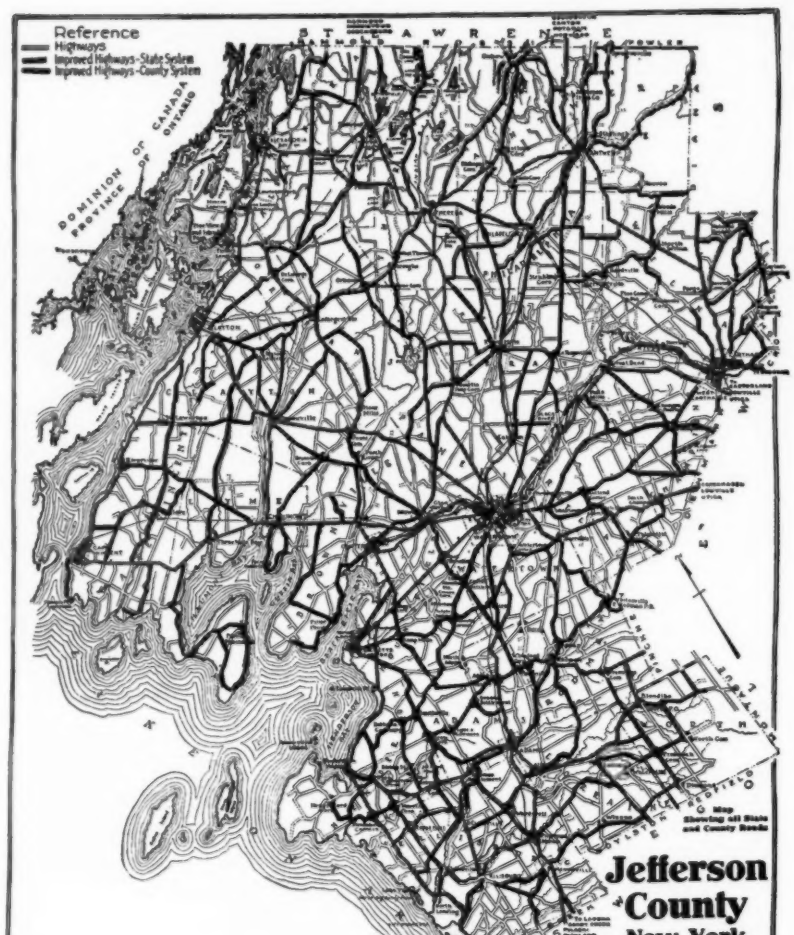
The city is laid out like many New England communities—that is, with a public square or park in the center of the business district, and the principal streets radiating from the square like spokes from a wheel. Similarly do most of the main roads of Jefferson County radiate from this county seat. All this is explained by the fact that while Jefferson County is not in New England, its people—most of them—are descendants of those who did come from New England. In fact, Jefferson County today may be regarded as more typically "New England" than many New England areas.



● *With the 10-B and a few trucks, it is a simple and inexpensive matter to cut down hills and fill low spots in the roads.*

County Highway Superintendent Coordinates Work in 22 Townships

When the New York State Highway Department was established years ago, a state highway division office was located at Watertown. One of the young inspectors working out of that office was Walter R. Eggleston. After sixteen years service with the state Mr. Eggleston was appointed the Highway Superintendent of Jefferson County, and has occupied that position for the last twelve years. As a result he has plenty of experience gained on the home grounds. This is a great asset in dealing with the town highway superintendents of each of the 22 townships of the county, and coordinating the work so that it is done as effec-



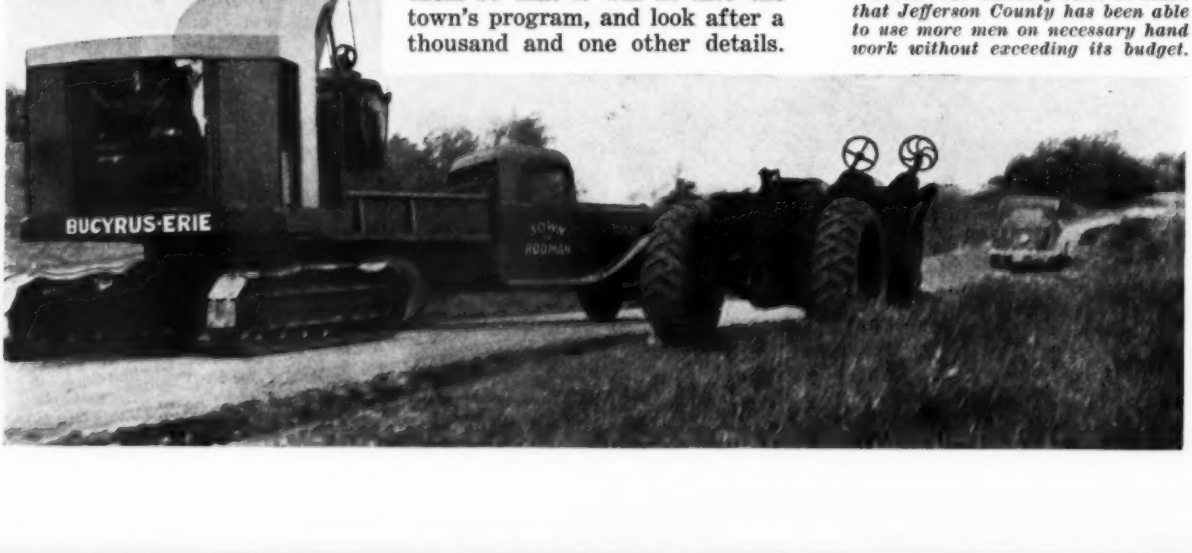
● *The improved highways belonging to the county system are shown on this map.*

tively and economically as possible for the whole county. Mr. Eggleston works immediately with and is chiefly responsible to the County Highway Committee of Jefferson County Board of Supervisors. The Board passes on all appropriations, and most other matters, but this is more or less a formality since the recommendations of its Committee are usually accepted. This is a practical, working committee, and, once appointed by the Board to this committee assignment, the members usually stay on it until death or political change overtakes them, the latter possibility being the least likely. The knowledge of highway problems and how to meet them which is developed by this experience in committee work, Mr. Eggleston says, is a real asset in his work.

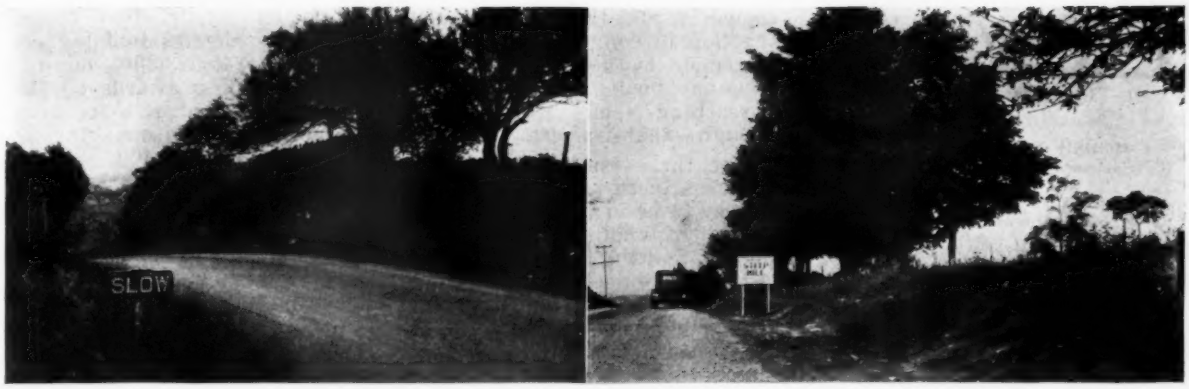
It should be stated here that in New York State, the county, as a unit of government, figures in road construction and maintenance in one of three ways. The county may have all of its road work done under contract, or it may own all of its equipment and do practically all work itself, or it may own little or none and encourage the townships to buy equipment and then, in a sense, rent the township equipment as it may be required by each job. Mr. Eggleston, in Jefferson County, follows the latter policy.

County Owns Essential Road Building Equipment

This means that Mr. Eggleston has a fine job of coordination ahead of him all the time. He must work intimately and most effectively with 22 town superintendents, plan county work with them so that it will fit into the town's program, and look after a thousand and one other details. When working on county roads, either in new construction or maintenance, the county takes over the whole township set-up from the town superintendent down. While the town superin-



● *This speedy ⅜-yard shovel has reduced road building costs so much that Jefferson County has been able to use more men on necessary hand work without exceeding its budget.*



● *Left: Automobile traffic moves easily and safely over the widened roads through the hills in Jefferson County. Right: Another example of Superintendent Eggleston's work toward promoting safe travel—shallow ditch, flat back slope, and adequate traffic signs.*

tendent does pretty much as he pleases on strictly town work; on county jobs, he and his men take orders from Mr. Eggleston.

So Jefferson County's road building equipment consists of bare essentials, items which in most cases the towns do not own. For example, the county equipment includes a 10-B Bucyrus-Erie, ⅜ yard shovel; a half-yard Byers Bearcat; two Walter 5-ton trucks, four Selden 4-yard trucks; two Liberty 3-yard trucks; an 8-ton Buffalo-Springfield roller; an 8-ton Galion tandem roller; a Rogers Brothers trailer; a 1000-gallon Bituminous distributor; and an Adams No. 1 Retread Paver which is used with a Linn Tractor-truck.

A few years ago the County Board gave Mr. Eggleston permission to use a piece of vacant land owned by the county located just outside Watertown on a railway line. Here Mr. Eggleston has built up a headquarters for his staff and shops for his equipment. All trucks are brought in at night. Here during the winter, all equipment is overhauled. Storage space is available for much material including two 9,000-gallon and two 8,000-gallon tanks for bituminous road material, one 15,000-gallon tank for gasoline, and another of the same capacity for fuel oil. Equipment has been installed at this headquarters for making concrete pipe, and in the near future the shop will make fence posts.

A working force of 18 men, foremen, shovel operators, and drivers, overhaul the equipment in the shops during the off season. Each man uses the same piece of equipment month in and month out, and he is held responsible for its performance. The base labor wage in the summer is 40 cents an hour, with foremen and drivers receiving 45 to 50 cents an hour and shovel operators 75 cents. However, no more than 50 cents an hour is paid during the winter for the maintenance and repair work at headquarters.

Working on ordinary road maintenance under Mr. Eggleston are 12 county highway patrolmen. Each patrolman has a one-ton truck and three men. From October 1st to December 15th or a little later, they are engaged in brush cutting. When they are not otherwise busy with maintenance work they make minor improvements such as widening turns at intersections, though in Mr. Eggleston's opinion turns will never be made wide enough for a certain type of driver. He feels that these improvements at intersections materially increase the safety factor. Widening roads and shoulders on curves and hill crests may also be done by the patrolmen when they have the time.

● *Superintendent Walter Eggleston has plenty to do, coordinating his county highway work with that of 22 townships.*

Twenty-five Miles of Roads Rebuilt Last Year

In the 12 years Mr. Eggleston has been county highway superintendent—since the beginning of the present system—725 miles of roads have been turned over by the towns to the county for reconstruction and maintenance. At least 100 miles of the new roads taken over have been rebuilt in the last few years—25 miles of this was done last year.

But Mr. Eggleston is much more interested in improving the roads already built than in constructing new ones. He is constantly taking old roads before they are entirely ruined and rebuilding them, at low cost, to a point where they may be used with comfort and safety. He has practically standardized on a certain type of road, the main portion of which is 10 feet wide but which, with shoulders, is 16 feet over all on the straight-away. Rarely is a ditch more than 18 inches deep, just deep enough to insure sufficient drainage. The shoulders on each side of the 10-foot strip are at least 3 feet wide and 18 inches deep, finished with asphalt and thoroughly rolled so that no ragged edges will develop, and the level with the main road strip will always be maintained. On curves and on blind spots, such as the crests of hills, these measurements, particularly as regards

(*Continued on page 473*)

EXCAVATING ENGINEER

A Monthly Publication Devoted to Excavating and Allied Subjects

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The Business Situation

THERE appear to have been no important developments in the status of business during the past few weeks. The problems which a month ago faced business men are essentially the important problems of today. Certain undesirable legislation still hangs over business with a threatening aspect which tends to retard the increase of business activity. The amount of building construction and especially residential construction continues to be one of the most promising factors in the situation.

The President of the United States has promised business and industry "a breathing spell." Business men, in general, welcomed it, and the most common reaction in connection with that statement is the hope, expressed by many business men, that the "breathing spell" will be long enough—that is, permanent.

The three "soft spots" in the business picture of the moment, appear to be in the iron and steel industry, building materials industry, and the railroad industry. All of these depend greatly upon the construction industry, and primarily upon private construction; perhaps more, we expect, they depend upon the construction of private residences, thus the record of residential construction is reassuring. The fact that the figure for August was 16 per cent smaller than the figure for July is not nearly as important as the fact that the August figure is a gain of 100 per cent over the figure for August, 1934. It is normal for residential building to decrease in the late summer and the fall.

"Construction in August reached a new high level for 1935. The contract total exceeded in addition, the totals reported for each month since October, 1931 with the exception of December, 1933, January and March of 1934. Figures by F. W. Dodge Corporation indicate an August contract total for all types of construction in the 37 eastern states amounting to $168,557,200. During July the volume reported totaled $159,257,500 while in August 1934 only $119,591,800 in contracts were reported.

"August construction records showed residential building contracts of $40,528,300, non-residential building awards of $58,488,500 and contracts for heavy engineering projects in the amount of $69,540,400.

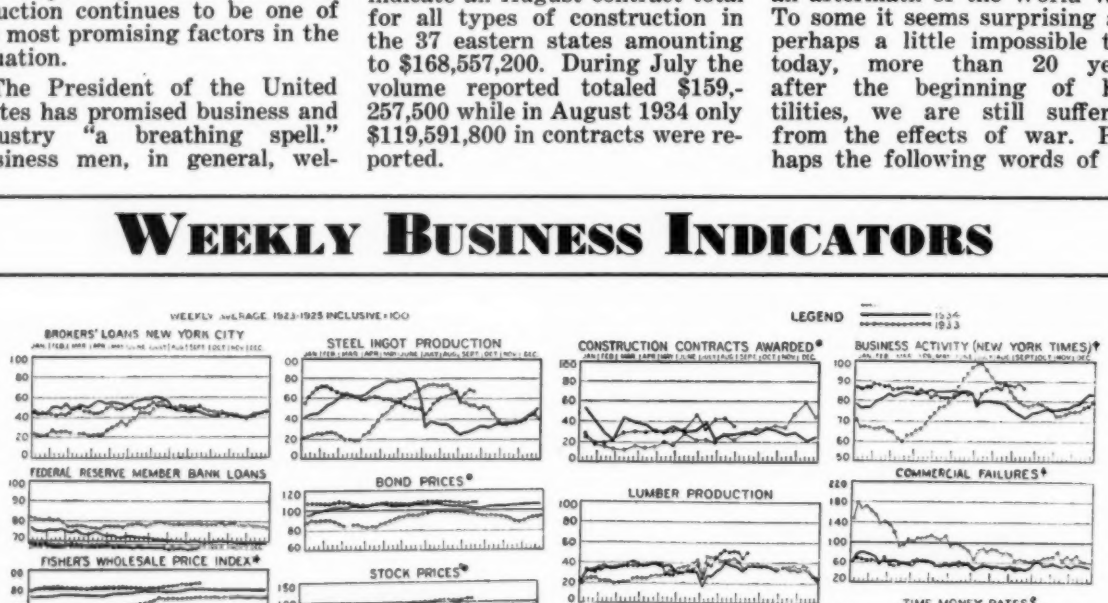
"For the first eight months of 1935 residential contracts awarded in the 37 eastern states totaled $297,076,700 as compared with only $170,226,500 for the corresponding period of last year.

"Non-residential building contracts as well as awards for heavy engineering projects during August exceeded the levels reported for either the previous month or August 1934."

Cause and Effect

AS WE APPROACH the seventeenth anniversary of the cessation of the World War hostilities in Europe we find ourselves gradually emerging from a depression more severe than any our country has ever before experienced. It is rather surprising to reflect that today the pleasure of seeing economic conditions gradually returning to a more normal state overshadows the realization that this depression is an aftermath of the World War. To some it seems surprising and perhaps a little impossible that today, more than 20 years after the beginning of hostilities, we are still suffering from the effects of war. Perhaps the following words of Dr.

WEEKLY BUSINESS INDICATORS



Nicholas Murray Butler, quoted from the Readers' Digest, will help drive home the reasonableness of the direct association, as cause and effect, between the World War and the present depression—an association which is most definitely borne out by statistics covering long periods of time:

"The World War, all told, cost —apart from 30 million lives— 400 billion dollars. With that money, we could have built a $2,500 house, furnished it with $1,000 worth of furniture, placed it on five acres of land worth $100 an acre and given this home to each and every family in the United States, Canada, Australia, England, Wales, Ireland, Scotland, France, Belgium, Germany and Russia. We could have given to each city of 20,000 inhabitants and over, in each country named, a five million dollar library and a ten million dollar university. Out of what was left we could have set aside a sum at five per cent that would provide a $1,000 yearly salary for an army of 125,000 teachers and a like salary for another army of 125,000 nurses."

County Highway System Improved

(*Continued from page 471*)

the width of shoulders and ditches (but not depth), are always increased materially, resulting in a greater safety factor.

The writer saw one of the old roads being resurfaced by Mr. Eggleston's method. This road, 1.6 miles long, had been built in 1917 of water-bound macadam. The resurfacing work consisted of applying a two-inch layer, 10 feet wide, of No. 2 field stone. The stone was bound with asphalt, N. Y. state specification No. 68, mixed on the road by the Adams Paver hauled by the Linn Tractor-truck. The paver was hauled over the road three times, thus giving nine mixes. Leveling was done on the last time over. After the roller made four or five passes, a seal coat of asphalt was applied. Then enough No. 1 field stone was spread on the road so that none of the black seal coat would show. It was then rolled again three or four times a day for three or four days. The shoulders and ditches were of course lined up at the same time.

Shovel Cuts Rebuilding Costs

It is on this type of work, involving much work in preparation of shoulders, ditches, and back-grading, that the Bucyrus-Erie 10-B shovel has been used to such good advantage that it has been the means of putting ten more men at work in Jefferson County for the season. At the same time Mr. Eggleston says it has been possible for him to get 10 per cent more results on the money allotted for road work. The saving which the 10-B makes possible is in truck hire and shovel operation cost. While it does much work that is usually done by hand labor, the money it saves makes it possible to put more hand labor at work where it is needed.

In other words, Mr. Eggleston has a definite amount of money to spend on his county highway system. When that is spent there isn't any more. The 10-B shovel has proved so economical and adaptable for his type of work that he has been able to pay for and has actually put to work ten additional men this season, and he expects to accomplish at least 10 per cent more this season than before.

Wilfred Parsons, an experienced operator, runs the 10-B shovel. The portability of this shovel is shown by the fact that it is possible to load the 10-B on its trailer and move it to practically any point in the county within an hour. The 10-B has been working almost every day since it was delivered in April.

In the particular type of road improvement work which Mr. Eggleston is doing he feels that the full-revolving ⅜-yard shovel is about ideal. This region is hilly with the Adirondack Mountains but a few miles away. In ages gone by, most of it was ridged and furrowed by glaciers. With the 10-B, a few trucks, and some men, it is not a costly business to cut down hills and fill up low spots in the road. It is easy enough, with the shovel, to widen the usable right of way, and to cut down back-slopes, often to the fences, so that they obstruct the view as little as possible on curves. It has proved invaluable in pulling out smaller trees and shrubs. Most of the work for the shoulders, the shallow ditches, and the back-slope, can all be done in one operation with this brisk, adaptable shovel.

● *Widening shoulders and ditches is easy work for the 10-B shovel.*

Before we leave Mr. Eggleston we believe it of interest to mention two further points of economy which are peculiar to his methods of administration and operation: First—it is not necessary to get a huge appropriation to establish a highway equipment headquarters such as he has created near Watertown on ground already owned by the county. With the exception of one small appropriation for a certain building, all of the improvements were made piece-meal whenever it was possible to spare the money, often but a few hundred dollars at a time, from the county highway fund. The county now has a plant of considerable worth, the result of careful management and not at the price of a special capital outlay.

Second — in recent years, too, Mr. Eggleston has been purchasing stone quarries and gravel pits at various strategic points for the county. Most of them will pay for themselves in a season or two. This means more money to use for other highway purposes.

Field Notes

Water Main Break Costly

READING of a decision of the New Mexico Supreme Court is apt to cause excavating contractors to exercise extreme care to avoid breaking water mains, etc., in streets in the performance of contracts.

Although a paving contractor knew the location of a water main in excavating a street in Roswell, N. M., a power shovel was so operated as to break the main. This happened at 10 o'clock a. m. The contracting company immediately notified the city, which undertook repairs. The repairs were not completed until about 6:00 p. m. About 5:30 p. m. plaintiff's house caught fire, and the property was seriously damaged through lack of sufficient water pressure, although slight pressure would have permitted extinguishing the fire.

In a suit against the company and the city for damages, the city seems to have been exonerated from liability on a theory that it made the repairs with due promptness or was immune from liability because engaged in governmental activities.

Judgment against the company for $3,700 was upheld by the New Mexico Supreme Court (Gilbert v. New Mexico Construction Co., 44 Pac. 2d, 489). The following points were decided by the court:

The company's negligent breaking of the main being the primary cause of the insufficient water pressure, the company was liable even though the city failed to repair the break as promptly as could have been done.

The fact that the city was protected against liability for failure to maintain sufficient water pressure for fire-fighting purposes, because of immunity granted governmental agencies, did not exempt the company from liability. Apparently, the city would not have withheld sufficient pressure except for the interfering act of the paving company in breaking the main.

The jury was warranted in finding that the paving company should have foreseen that breakage of the main might cause a fire loss due to insufficient water pressure.

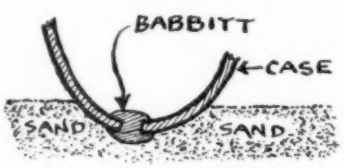
But had it appeared that the contractor knew that the city maintained shut-off valves enabling the localizing of diminished pressure, without affecting the pressure in other parts of the city, or had it appeared that cities generally or universally maintain such shut-offs, then the company might have been exonerated on a theory that it was not bound to foresee that break of a main in one part of the city would affect water pressure in another part. And this is so although the shut-off valves, without knowledge of the contractor, might have been useless because of corrosion.

—Arthur L. H. Street,
Attorney-at-Law.

Handy Babbitt Repair Kink

THIS SKETCH shows a method I have successfully used for closing holes in castings by means of babbitt metal. It is quicker than any other method I have encountered.

Simply place the broken part in a box of sand, as illustrated. Push



away enough of the sand from the edge of the hole so that the babbitt will securely clamp around both sides. You are then ready for the pouring of the babbitt.

Pouring babbitt is such a simple process that I feel I need not describe it here.

Welding, of course, is better. But for temporary work this babbitt method serves the purpose very well. In fact, one of my babbitt repair jobs performed more than 20 years ago is still good.

If you have no babbitt, use lead or similar metal having a low melting point.

— W. F. Schaphorst, M.E.

Economies of Dust Collecting Systems

THE VILLIAN of the dust problem is a particle so fine that it is invisible to the eye, and passes through nature's defenses to the uttermost limits of the lungs. Its size is not more than 1/25,000 of an inch (10 microns) and may be one half of that or even less, according to M. I. Dorfan, manager of the dust collector division of Blaw-Knox Company, Pittsburgh, who has designed some of the world's largest and most unique dust collecting installations.

"The damage wrought by these dust particles depends on their composition," stated Mr. Dorfan in a paper which he read before the Greater New York Safety Conference, "Silica has caused silicosis, a serious lung ailment; manganese, when ingested, has caused serious illness; baker's flour produces violent explosions. Some dusts are corrosive, some abrasive and others acid or caustic in their reactions."

Discussing the differences in dusts, Mr. Dorfan pointed out that their effects vary curiously:

"Silica — silicon dioxide — is known to cause a serious disease, silicosis. Yet silicates in general are not known to be harmful and one of the most common, cement, contains an active calcium radical which is positively prophylactic in effect. The U. S. Health Service has even found that tuberculosis can be arrested in a cement plant worker who continues at his work. On the other hand, other common silicates have been definitely proved to be the sources of serious diseases. Lead dust is very harmful, both mechanically and from its chemical, poisoning effect, but carbon dust has never been proved injurious, although it blackens the lungs."

Dust collecting is often a source of profit which may exceed the cost of doing the work:

"Children's 'sparkler' fireworks and cement floor hardener are two things made from cast iron dust which otherwise would be a serious shop nuisance, ruining machine bearings, clogging drains and making windows unwashable. A rock crushing plant found its dust worth more as asphalt filler than the rock itself. A coal-cleaning plant found the dust from its $1.75 coal worth $6 a ton for foundry mould facings. A wrought iron manufacturer who annoyed a whole neighborhood with fumes from soda ash used in his process now collects the sodium carbonate dust into which the process converts the soda ash and thus obtains water softening material for a large plant, saving thousands of dollars a year, or several times the cost of his dust collecting installation."

EQUIPMENT
You Ought to Know About

Bucyrus-Erie Announce Fast 2½-Yard Diesel

FOR A NUMBER of years contractors and other dirt movers have taken advantage of the increasing economies of larger and larger machines. Recently there has been considerable demand for a high-speed, compact, readily mobile, contractors' unit in the 2½-yard size. Excavators of this size have been available but they were designed for permanent installations where speed and mobility were of minor importance, or were "stretched" by putting large buckets on machines designed for lighter service.

The new Bucyrus-Erie 55-B is claimed to be just what the field has wanted, a big capacity unit with small-machine mobility, compactness and convertibility. It is modern throughout, and has the strength and stamina to stand up to high speed 2½-yard digging and like it. Bucyrus-Erie claim it to be the fastest 2½-yard Diesel ever built and invite stop-watch comparisons.

The machine is exceedingly flexible being readily converted for dragline or shovel use. The machine carries a high A-frame giving extra strong support on dragline operation. Mast support is used for long range work where aluminum alloy booms are used. Special dragline cats are available with tapered ends for climbing out of mud and with an elongated end to keep the machine from "nosing" in. In all, four sizes of cats are offered to fit varying operating conditions. The big, heavy-duty, Diesel engine develops 215 horsepower and is claimed to be one of the most economical, dependable and efficient Diesels ever offered. Certainly here is a machine with plenty of power for any kind of digging you may want to tackle.

Shipping is made easy by the compact well planned layout of the unit and the machine ships over U. S. railroads with cab and machinery in place on the base. An ingenious arrangement utilizing an inexpensive loading device makes loading and unloading quick and convenient.

Controls are of the latest type, convenient, quick acting, and permit operating at maximum speed with safety and accuracy.

There are many new developments of interest on the new 55-B. For complete information write Bucyrus-Erie Company, South Milwaukee, Wisconsin, for the 55-B bulletin, or see your nearest Bucyrus-Erie dealer.

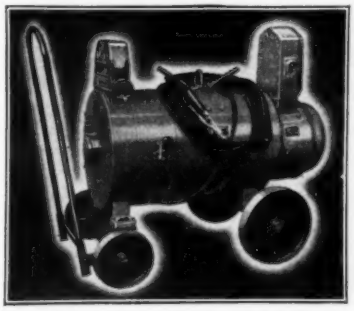
U. S. Super Air Hose

THE Mechanical Goods Division of U. S. Rubber Products, Inc., 1790 Broadway, New York City, has announced a brand new type of hose—the U. S. Super Royal Cord, built like a tire—for pneumatic tool and air drill service.

This new hose carcass, with cords laid in tough rubber cushions, makes U. S. Super Royal Cord so tough, it is said, that it shows remarkable resistance to external blows, bruises and abrasion, and can withstand any amount of pulsation and constant flexing in use. For additional protection against the destructive action of hot oil in the air line, the tube of this new air hose is made of the finest oil resistant rubber.

Heavy-Duty Welder

A NEWLY IMPROVED LINE of Heavy-Duty Arc Welders is announced by the Harnischfeger Corporation of Milwaukee. The most important changes and refinements include the new oversize, two-bearing armature shaft, removable ball bearing capsules, more simplified single current control, dustproof calibration plate, heavy-duty built-in polarity switch and drip-proof housings.



The new 200-amp. machine, illustrated above, retains the previous P&H-Hansen generator design with the patented internal stabilizer coils embedded in the main pole tips, unique short circuit winding and magnetic bridge which broaden the welding range and improve the uniformity of current. The general outward appearance of the 300- and 400-ampere units is identical.

Motors have solid cast frames with top opening for terminal leads and mounting of the magnetic switch-type starter. It is equipped with no-voltage release and overload protection; operated by push buttons. A constant flow of cooling air, circulated by the large aluminum fan between motor and generator, is discharged at the end of the all-welded generator housing. Connections are available for standard or special voltages of 2- and 3-phase, 60 and 50 cycles. Gasoline-powered units in a wide variety of stationary and portable mountings also are included in the new line.

SHOTS *from the Firing Line*

Sand and Gravel Output Up in 1934

THE increase in construction in 1934 was reflected in an advance of about 14 per cent in the output of commercial sand and gravel operations, according to a recent report issued by the Bureau of Mines. Activity in local roadbuilding projects, however, apparently slumped during the year for preliminary returns show a decline in the production of sand and gravel reported by states, counties, municipalities, and other government agencies. Available data on consuming markets and partial returns from producers indicate that the total output of sand and gravel in 1934 amounted to 113,000,000 short tons valued at approximately $65,000,000.

Sand and gravel sold for virtually all uses showed increases in 1934 compared with 1933. Molding sand, and fire and furnace sand reflected activity in the steel industry with advances of 30 and 41 per cent, respectively. Increased output of building and paving sand and gravel accounted for most of the advance in total commercial production. Values also were higher in 1934 than in 1933. The average value of all sand advanced from $0.61 a ton in 1933 to $0.69 in 1934, gravel increased from $0.59 to $0.64. Salient statistics of the sand and gravel industry in 1933, and preliminary figures for 1934 are shown in the accompanying table.

	1933		1934[1]		% of change	
	Short tons	Value per ton	Short tons	Value per ton	Tonnage	Value per ton
COMMERCIAL OPERATIONS						
Sand:						
Glass	1,781,423	$1.69	1,920,000	$1.75	+ 8	+ 4
Molding	1,718,251	.91	2,240,000	.95	+30	+ 4
Building	13,024,174	.50	16,400,000	.56	+26	+12
Paving	10,903,447	.51	11,500,000	.57	+ 5	+12
Grinding and polishing	572,735	1.29	580,000	1.75	+ 1	+36
Fire or furnace	106,133	1.14	150,000	1.55	+41	+36
Engine	1,051,695	.59	1,250,000	.75	+19	+27
Filter	24,387	2.14	35,000	2.00	+44	− 7
Railroad ballast[2]	721,381	.27	650,000	.31	−10	+15
Other	1,121,271	.45	775,000	.80	−31	+78
Total sand	31,024,897	.61	35,500,000	.69	+14	+13
Gravel:						
Building	11,934,080	.68	14,500,000	.67	+22	− 1
Paving	17,719,859	.59	19,500,000	.68	+10	+15
Railroad ballast[3]	4,928,031	.36	5,500,000	.41	+12	+14
Other[4]	499,605	.58	500,000	.50	—	−14
Total gravel	35,081,575	.59	40,000,000	.64	+14	+ 8
Total sand and gravel	66,106,472	.60	75,500,000	.66	+14	+10
NONCOMMERCIAL OPERATIONS[5]						
Total sand and gravel	41,648,877	.33	37,500,000	.40	−10	+21
COMMERCIAL AND NONCOMMERCIAL OPERATIONS						
Grand total	107,755,349	$ .49	113,000,000	$ .57	+ 5	+16

[1] Figures subject to revision.

[2] Includes some sand for fills and similar purposes. The quantity of sand reported as used exclusively for ballast in 1933 was 550,948 short tons valued at $160,576. The figures include sand produced by railroads for their own use in 1933 as follows: Ballast, 50,811 short tons valued at $7,694; fills and similar purposes, 170,433 short tons valued at $32,577.

[3] Includes some gravel used for fills and similar purposes. The quantity of gravel reported as used exclusively for ballast in 1933 was 4,668,597 short tons valued at $1,747,452. The figures include gravel produced by railroads for their own use in 1933 as follows: Ballast, 1,232,795 short tons valued at $247,522; fills and similar purposes, 259,434 short tons valued at $29,711.

[4] May include some gravel used by railroads for fills and miscellaneous purposes.

[5] By states, counties, municipalities, and other government agencies, directly or under lease.

National Gasoline Consumption Increases

GASOLINE consumption in the United States during the first six months of 1935 increased 3.95 per cent, or 305,942,000 gallons, over that for the first half of 1934, according to the American Petroleum Institute.

The report is based upon the quantity of gasoline reported for tax or inspection in the various states, but reflects, as nearly as is possible to obtain the figures, consumption throughout the country. It is explained that gasoline tax evasion, and changes in basic laws under which data were collected throughout the period, may have disturbed the comparability of reports for various states.

Central Valley Project Under Way

AN ALLOTMENT of $20,000,000 to the U. S. Bureau of Reclamation has been approved by the Works Progress Administration with which to start work on the Central Valley Irrigation and Power Project in California. Walker R. Young, Supervising Engineer during the construction of Boulder Dam has been placed on charge of this new project. The proposed project, estimated to cost $160,000,000, includes the construction of two dams, one 420 feet high and the other 252 feet high, which will create storage reservoirs, and numerous canals for distributing water. Power will be developed at each dam. The completion of this project, originally planned to be undertaken by the state of California, will provide a number of benefits in the San Joaquin and Sacramento Valleys. Some 40,000 acres of highly cultivated farm and orchard land in the San Joaquin Valley have been abandoned because of the lowering of the water table in that area. In addition, salt water has been infiltrating into the delta region during low water stages in the Sacramento River. The Kennett reservoir will store the spring floods of the Sacramento River and the water will be released at such a rate as to force the salt water back into San Francisco Bay and provide a surplus for diversion into the San Joaquin Valley.

Alaskan Highway Authorized by Congress

A MOTOR HIGHWAY to Alaska was brought one step nearer actuality by the bill passed during the recent session of Congress authorizing the President to enter negotiations with the Canadian government for the survey, location, and construction of such a highway.

At the present time travelers to Alaska must go either by boat or airplane from Seattle. During recent years there has been an increasing growing demand for a motor route. Proponents of the plan point out that the construction of such a road would result in an increase of the population of Alaska, and aid development of its natural resources, now relatively inaccessible.

Congress, in 1930, passed an Act authorizing the appointment of a committee to cooperate with representatives of Canada in a study regarding the proposed highway. After the study was made, the committee reported that the project was feasible from an engineering and constructional standpoint, and that substantial benefits would be derived from the new road.

1934 Sand-and-Gravel Trophy Winners

A BETTER safety record in 1934 than in 1933 was made by the producers of sand and gravel who participated in the sixth annual safety contest conducted by the United States Bureau of Mines in cooperation with the National Sand and Gravel Association.

The Van Sciver plant, Morrisville, Bucks County, Pa., of the Warner Company, won the trophy for plants working more than 100,000 man-hours. This lake-deposit plant operated 116,019 man-hours in 1934 without a lost-time accident. In addition to winning the trophy in the high unit for the past

Blasting NEWS

PUBLISHED BY

NO. 2 HERCULES POWDER COMPANY INCORPORATED WILMINGTON, DELAWARE

Headframe and ore bin of the Roadside mine.

GOLD MINING RECOVERY SEEN

Present-day revival in gold mining has resulted in the reopening of many small gold mines in the West. Mining districts, dormant for years, are coming back to life with gold ore shipments that presage even more extensive developments.

In keeping with this interest, a timely article on gold mining and milling methods was recently made available to readers of *The Explosives Engineer*. Descriptive of methods practiced in the Katherine District, Arizona, the article by Leon M. Banks, has attracted attention because conditions at Katherine resemble those in many other mining districts, and therefore much of the procedure can be adopted by other small gold mining properties.

Included in Mr. Banks' article is a summary of drilling and blasting methods in the various mines, together with a discussion of the history and geology of the district.

Gold mine operators who have not yet read the article may obtain copies by requesting "Gold Mines at Katherine," published in the May, 1935, issue of *The Explosives Engineer*.

HERCULES SHUNTS ARE DESCRIBED

The purpose of shunts on electric blasting caps is fully described in a folder entitled "Hercules Shunts" just printed by Hercules Powder Company.

Hercules manufactures two shunts—the "Wassen" type and the "Eyelet" type. Both are designed to minimize the probability of a premature explosion of an electric blasting cap which might be caused by electric current accidentally coming in contact with bare ends of leg wires.

The leaflet is illustrated with diagrams showing how the shunts are removed. Copies will be forwarded on request.

HERCULES
PLANNED BLASTING
makes available:

1. Explosives exactly suited to your work.
2. Organized methods enabling you to use them to best advantage.

WRITE FOR DETAILS

"Mine Foremanship" Demand Continues

Nearly 30,000 copies of the booklet *"Mine Foremanship,"* by Dr. J. J. Rutledge, have been distributed since its publication, according to officials of Hercules Powder Company. Many important companies are using it as a text in their extension courses to men who are studying for promotion.

Although written primarily for mining men, hundreds of copies have been requested by individuals and companies in wholly unrelated industries.

The booklet is a compilation of the first seventeen lectures in the monthly study course conducted in *The Explosives Engineer* by Dr. J. J. Rutledge, chief mine engineer, Maryland Bureau of Mines. This series is still a popular feature of *The Explosives Engineer*.

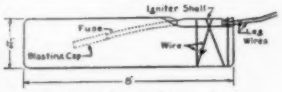
Demand for *"Mine Foremanship"* is based on its commonsense and simple style. Copies will be sent on request to individuals or firms.

MISFIRES TRACED TO FAULTY PRIMERS

Misfires were practically eliminated in a large coal mine when the management instructed miners in correct methods of making primers, according to an article recently published in *The Explosives Engineer*.

This was but one phase of an individual instruction program in the use of explosives, which resulted in a great reduction in explosives accidents with corresponding benefit to employes and employers.

Instruction was highly personalized, contact with miners being made in working places underground. Some of the subjects considered included: placement of holes; care of blasting machines, detonators, and powder; installation of firing lines; preparation of primers; charging of drill holes; misfires; accidents, their causes and prevention.



Proper Method of Preparing Primer, using Delay Electric Igniter.

That this instruction was responsible for a great reduction in fatal and non-fatal accidents is clearly shown in the charts illustrating the article.

Reprints will be forwarded on request.

HOW TO BLAST ON THE FARM

How are boulders blasted?

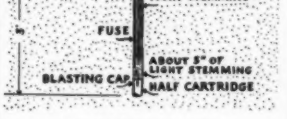
How is dynamite used to dig ditches?

How is a primer made?

How are explosives used in tree planting?

These and other questions pertaining to the use of explosives on the farm are answered in *The Explosives Engineer* for March and April, 1935.

Both issues of *The Explosives Engineer* containing this series will be mailed on request to those interested. Also the booklets *"Hercules Dynamite on the Farm"* are available to those interested.



Method of placing charge for subsoiling.

BLASTERS' SCALE FOUND USEFUL

Many quarry operators who like to "figure" the yardage of contemplated shots have found the Hercules Blasters' Scale of considerable help. The scale also gives suggested spacing of well-drill holes under various conditions.

The handy device which slips in a coat pocket, consists of a card which slides through a slotted envelope-container. Table 1 gives the number of cubic yards of material in the solid displaced per foot of hole at spacings ranging from 8 ft. to 26 ft. From Table 2 can be obtained the yardage for the entire length of the hole.

Besides these tabulations, the Blasters' Scale contains other important information of value to quarry operators. The scale is available, free of charge.

Convenient Coupon

HERCULES POWDER COMPANY
INCORPORATED
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Please send me information concerning:

☐ Hercules Shunts; ☐ Planned Blasting; ☐ Gold Mining; ☐ Mine Foremanship; ☐ Blasters' Scale; ☐ Making Primers; ☐ Dynamite on the Farm.

Name _____

Address _____

Position _____ A-52

Shots From the Firing Line— *Continued*

year, this plant won the trophy in the low unit in 1933, and the trophy in the high unit two previous years, 1931 and 1932. This plant has worked nearly one half of a million (479,032) man-hours during the past four years without an accident causing loss of time to an employee.

The Oxford plant, Oxford, Oakland County, Michigan, of the American Aggregates Corporation, won first place in the low unit (less than 100,000 man-hours), without a lost-time accident. At this plant, sand and gravel are obtained from a dry bank deposit.

Of the 39 plants enrolled in the 1934 contest, 24 had no lost-time accidents during the year; these plants were all in the unit whose operations were less than 100,000 man-hours except two. A certificate of merit is awarded to the operator of each plant which has a perfect safety record but whose aggregate exposure in man-hours was less than that of the winning company.

The purpose of the contests is to aid in the promotion of safety among the employees and the reduction of accident costs to the companies. Through the development of friendly rivalry among the various plants and among the employees of each individual plant, interest in the prevention of accidents is sustained throughout the year.

Road Builders to Meet in Cleveland

THE AMERICAN Road Builders' Association announces that the annual convention, together with an old fashioned road show, will be held in Cleveland, Ohio, January 20 to 24, 1936. The convention and road show will cover completely all divisions of the industry and profession, and all classes of equipment and materials will be displayed. The meetings and equipment display will be held in the Cleveland Exhibition Hall.

Shorter cable overhaul. Exclusive power-arm combination of lever and block-and-tackle, giving unusual digging power. These are reasons why the Williams "Champion" Bucket is a real time saver . . . *money maker* . . . for users.

THE WELLMAN ENGINEERING CO.
7002 Central Ave., Cleveland, Ohio

WILLIAMS BUCKETS

Highway Labor Regulations Modified

THE RULES and Regulations, as originally set up, for carrying out the provisions of the Emergency Relief Appropriation pertaining to highways and grade crossings carried a requirement making it mandatory that 90 per cent of the contractor's labor must be taken from the relief rolls. This requirement has been amended, and approved by the President, so that the contractor is permitted to employ a person certified for assignment to work by the U. S. Employment Service, preference being given to those on public relief rolls. Section 12 of the rules and regulations now reads:

"Contracts for all projects shall provide that (except in executive, administrative, supervisory and highly skilled positions) only persons certified for assignment to work by the U. S. Employment Service shall be employed, and that preference in the employment of persons certified by the U. S. Employment Service shall be given, when they are qualified, to those from the public relief rolls.

"No persons under the age of sixteen (16) years, and no one whose age or physical condition is such as to make his employment dangerous to his health or safety or to the health and safety of others shall be employed on any project. This paragraph shall not be construed to operate against the employment of physically handicapped persons, otherwise employable, where such persons may be safely assigned to work which they can ably perform."

Highway Research Board to Hold Annual Meeting

THE FIFTEENTH annual meeting of the Highway Research Board of the National Research Council will be held in Washington, D. C., on December 5 and 6, 1935. Further information concerning the program will be published at a later date.

New England Notes

By E. D. COOGAN

A power project, of national interest because it is financed with Federal funds, is rapidly getting under way at Eastport, Maine. Known as the **Passamaquoddy Bay Project**, it is being built to develop electrical energy from the large variations in tide which occur in this region of the country.

In brief the general plan is: To create and maintain a low-level pool in Cobscook Bay, Maine, and to use the difference in head between this pool and the ocean, which will vary with the tide, to generate electric energy.

The initial development will utilize the head above five feet in a main power station with an installed capacity of 166,670 K.V.A. To secure these results the following elements are included in the project—five dams, one power house, emptying gates, one lock, a transmission line, and a pump back or storage plant. As the tides rise and fall, surplus power will be transmitted over a high tension line to the pump back plant which will pump water from the sea 135' up into a storage lake near Haycock Harbor. During the shut-down periods, which will be for two 5-hour periods each day, this storage water will be used to generate power by letting it flow back through the turbines at the storage plant. This will mean that although there will be 10 hours during the 24 in which the main plant cannot operate the project will furnish continuous power by using the water from the storage reservoir.

The total excavation involved amounts to approximately 8,000,000 yards of rock and 20,000,000 yards of earth. Considerable of the rock is to be used in the construction of the dams, some of which are rock filled. These figures will be subject to a certain amount of modification because some items of the design have not been fully decided upon as yet. The work at Passamaquoddy Bay is under the direct charge of Lt. Col. Fleming of the U. S. Engineers. Dexter Cooper, whose original idea the project was, is acting in a consulting capacity.

New York Notes

By G. E. PETERSON

Low bidders at the recent State highway letting were: **John H. Bolton**, Watkins Glen, $127,623 for 1.75 miles of 30-foot concrete in Chemung County; **Holmes & Murphy**, Buffalo, $75,939 for 3.1 miles 20-foot macadam in Erie County; **Utica Construction Company**, Utica, $284,484 for 10.8 miles variable width macadam in Niagara County; **Lane Construction Company**, Meriden, Connecticut, $175,432 for 3.8 miles 20-foot concrete in Orange County, and $303,445 for 6.7 miles of 20-foot concrete in Columbia County — 184,000 yards of excavation; **Johnson, Drake & Piper**, Freeport, L. I., $173,853 for 2.2 miles paving on the Laurelton Parkway in Queens and Nassau Counties; **A. D'Angelo**, Bronx, $233,007 for a grade separation on the Henry Hudson Parkway; **John Bellardino**, Seneca Falls, $328,062 for 11.1 miles of 20-foot concrete in Seneca County; **O'Connell & Laub**, Dayton, Ohio, $254,526 for 11.4 miles of 20-foot gravel in Otsego County—216,800 yards of excavation; and **Rochester Concrete Construction Company**, Rochester, $309,686 for 5.7 miles of 30-foot concrete in Oswego County.

Low bidders on various projects in the Metropolitan area were: **George H. Flinn Corporation**, New York, $701,000 for sewer tunnels on Ward's Island sewage plant; **George T. Kelley**, Yonkers, $74,000 for pumping station at Yonkers; **M. Delbalso**, Bronx, $36,494 for sewer work in the Bronx; **Doyle & Doyle**, Scarsdale, $59,485 for the Kap-

For your convenience in writing to The Wellman Engineering Co., you will find a card bound in this issue.

HOW much, how fast, and how long will it dig? Upon the answers depend profits. And it is the answers given by the dredge in action that count. For over half a century, Bucyrus-Erie has been building dredges which have dug much . . . fast . . . over long periods. Building for low cost output is not guesswork with Bucyrus-Erie engineers. They know from actual experience how to get the results you want under the conditions under which you must operate. "Bucyrus-Erie Built" is good insurance of output profit on your dredging jobs.

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Shots From the Firing Line— *Continued*

pock Street Bridge on the Henry Hudson Parkway; **Faraco Brothers**, Oyster Bay, $43,193 for paving at Plainview; **Francis Camisa**, Brooklyn, $27,800 for sewers in Brooklyn; **Gifford Construction Company**, Jamaica, $31,955 for paving and storm drains at Port Washington; **E. M. Underhill & Son**, Glen Cove, L. I., $69,224 for paving and storm drains at Bayville, L. I.; **Andrews Road & Supply Company**, Mineola, $42,351 for paving and storm drains at Mineola; **E. D. Waters Company**, New York, $607,973 for general contract on gymnasium in Brooklyn; **Demenna Construction Company**, Bronx, $45,410 for sewer outlet in New York; and **Rosoff Brothers**, Brooklyn, $1,400,000 for incinerator at 12th Avenue and 56th Street in New York.

James O'Connell & Sons started excavating on the Astoria approach for the Tri-Boro Bridge on June 1st, 1934. By September 1, 1935, they had completed 500,000 yards using a Bucyrus-Erie 1¾-yard 43-B shovel and a ⅞-yard B-2 steamer. The average haul for the material was about 1½ miles involving the use of 10 trucks during the bulk of the job. During this time the steamer worked only six months, the rest of the yardage being handled by the 43-B. Bob McCarthy operated the 43-B and the B-2 was run by Sam Hanley. James O'Connell was assisted by his brother "Con" who supervised operations at the dump. James O'Connell, Jr., relieved on the 43-B, and his brother Francis handled the time keeping and pay-rolls.

HELP *for dragline men*

IF you use chain you need these links and rings, which the many enthusiastic owners say are indispensable. The BECO Link permits quick repair of broken chain and fast connection in chain rigging. The BECO Ring revolves, spreading wear around its circumference — allows free movement of chain and sets itself for direct line pulls. You need them — they'll save time and money. Order them today!

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Beg Your Pardon

The August issue reported that Greco & Ering, New York, were low with a bid of $87,777 on a water main project in the Boro of Richmond. This statement is in error as the **Kenlon Construction Co., Inc.**, of New York City was awarded that contract.

Ohio Notes

By H. F. UNGER

Madsen Construction Company, Minneapolis, was low with a bid of $2,882,770 on the West Side Housing Project in Cleveland.

George A. Fuller Company, Washington and New York, was low with a bid of $2,613,000 on the Outhwaite slum clearance project, also in Cleveland.

A grant of $145,428 by PWA to the City of Cleveland to help build the $323,175 Big Creek Interceptor sewer has been approved by President Roosevelt. The new sewer will connect with the south disposal plant now under construction.

The Hunkin-Conkey Construction Company was awarded a contract to build an administration building at Cleveland's sewage disposal plant at Lake Shore Boulevard for $317,140.

Michigan Notes

The State Highway Department recently announced the following awards: **E. C. Nolan & Son**, Detroit, .457 miles of grading, surfacing and grade separation in Calhoun County for $106,797; **Baxter Cartage Company**, Detroit, 1.723 miles of grading and culverts in Grand Traverse County for $73,155; **Walbridge-Aldinger Company**, Detroit, .121 miles of grading, paving and grade separation in Hillsdale and Lenawee Counties for $88,344; **W. H. Mueller**, Detroit, .449 miles of grading and grade separation in Wayne County for $119,820.

By H. F. UNGER

The Zenith Dredge Co., Duluth, Minnesota, was recently awarded a contract by the U. S. Engineers to dredge approximately 1,800,000 yards at a unit price of 13½ cents, from the Keweenaw waterway which connects Hancock, Michigan with Lake Superior. Specifications call for a draft of 22 feet.

The construction of a **twenty million dollar sewage disposal plant** in Detroit at West Jefferson Avenue and River Rouge was assured when President Roosevelt signed a nine million dollar grant with which to start work. According to plans the additional eleven million dollars needed to complete the project will be obtained from PWA.

Illinois Notes

By A. J. KOENIG

The Illinois State Highway Commission has asked the WPA for **a grant of $18,774,450 for highway improvement and grade elimination.** $10,388,950 of the amount is to be used for 86 grade crossing elimination projects in thirty-seven counties.

E. O. Korsmo, Memphis, Tennessee, has contract for the construction of levees and flood gates at Cairo, Illinois.

J. R. Burner, Oblong, has contract for box culverts and a steel I-beam bridge in Fayette county, Illinois.

St. Louis and Vicinity

By A. J. KOENIG

Mid-West Construction Company, on their bid of $32,206, received award for the construction of Section C-4, Downtown Relief Sewer in St. Louis.

The City of Independence, Missouri, plans the **construction of a concrete viaduct** over the Missouri-Pacific tracks at Lexington and Crysler Streets.

Alfred Lewald has contracts from the city of St. Louis for paving several streets and alleys.

River Notes

Rock Island District

S. A. Healy Company, Chicago, received an award to construct Dam 18 for $2,515,138. The dam is to be built about seven miles upstream from Burlington, Iowa. Principal items of work involved are: 150,000 yards of common excavation; 40,000 yards of top soil excavation; 225,000 yards of dike embankment; 32,000 yards of riprap; 26,500 yards of embankment gravel; and 65,950 yards of concrete.

Maxon Construction Company, Dayton, Ohio, received an award to construct Dam 11 for $2,358,806. The dam is located near Dubuque, Iowa.

St. Louis District

An allotment of $3,500,000 has been made to the U. S. Engineers for construction projects in Illinois and Mississippi. A portion of the money will be used for bank improvement and channel rectification work in the Illinois River and the construction of locks at Peoria, all being a part of the project to provide a nine-foot navigable channel in the Illinois Waterway connecting Lake Michigan and the Mississippi River. The other project provided for in the allotment is the construction of the Sardis Reservoir in Panola, Lafayette, and Marshall Counties in Mississippi. The project includes the construction of an earth fill dam 9,435 feet long and 89 feet high.

Fort Peck Dam Notes

Mountains are being moved at Fort Peck these days—not with faith alone—but with the aid of **modern dirt moving machinery.** A typical day's output is made up as follows: 170,000 yards from the four dredges; 10,000 yards on Wunderlich's job; 35,000 yards on Spillway Builders' section; 2,000 yards on Addison-Miller's cut-off work; and 4,000 yards on Mason & Walsh's tunnel job. Adding to this, 2,000 yards of sand and gravel aggregates, 10,000 yards of toe gravel, and 2,000 yards of boulders, all of which are received daily, the imposing total of 235,000

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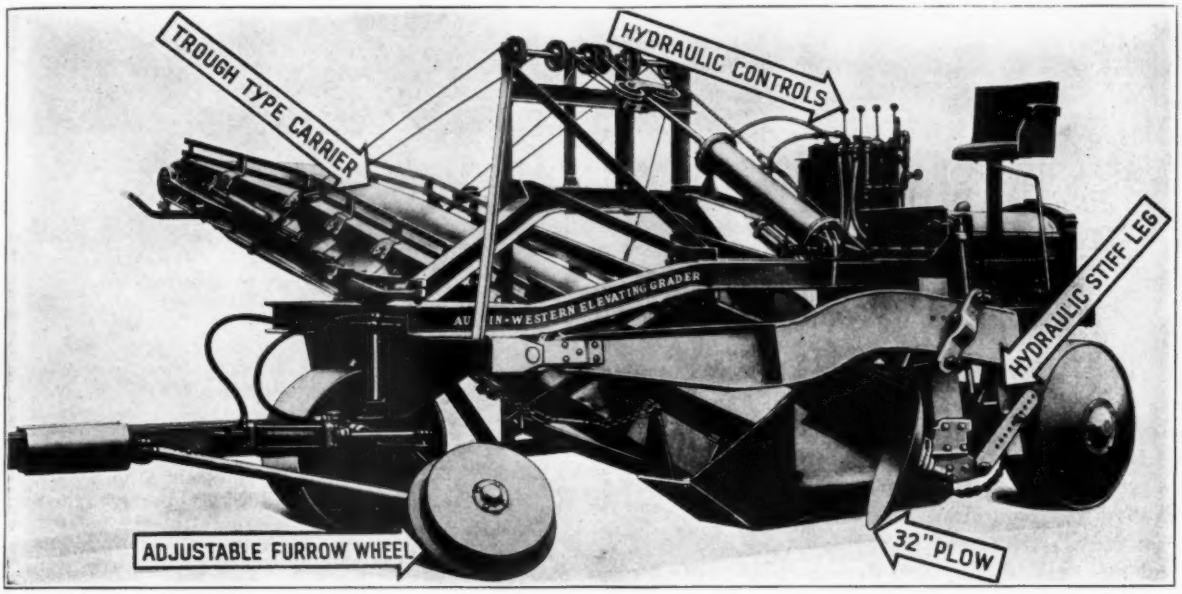
Only Austin-Western makes this

EXTRA CAPACITY

ELEVATING GRADER



. . Greatest Advance in 70 Years of Elevating Grader Building . . . Breaks All Records for Capacity

● Re-check your costs! The new Austin-Western Elevating Grader (3-wheel) makes even your latest figures out of date.

Design Gives Greatest Capacity Ever Developed

The new capacity of the Austin-Western Elevating Grader comes from its advanced 3-wheel design.

An entirely different "line of balance" places maximum weight over the plow where it belongs, while at the same time much unnecessary weight has been eliminated to produce a faster, more flexible machine.

The 32" plow is under double hydraulic control; (1) The stiff-leg action permits the operator to force the plow into the ground to any desired depth and hold it there; and (2) the new furrow wheel (see illustration) controls the width of the cut. Because of this positive depth and width of cut the operator gets maximum capacity under all conditions.

This increased digging capacity made it necessary to develop a new conveyor to carry the dirt away at higher speed. It is built of alloy steel 60% lighter than that formerly used in conveyor construction and its trough shape prevents the slowing up of the dirt caused by side friction.

The single wheel supporting the front truck eliminates twisting strain when traveling over rough ground, and square turns can be made in either direction.

This new elevating grader is one of the many earth moving machines built by Austin-Western. Send the coupon for complete information.

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The Austin-Western Road Machinery Co.
C-9, Aurora, Illinois.

Please send complete information on the Elevating Grader.

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UP or DOWN or SIDEWISE with Handy Hoists

LIFT up, pull down, or move sidewise . . . the Bucyrus-Erie Handy Hoist gives you a powerful pull in any direction. Light in weight, easy to attach and operate, this is a one-man tool that saves time and money in a multitude of ways every day. Bucyrus-Erie Handy Hoists are invaluable on any job. Four sizes — ¾, 1½, 3, and 6-ton capacities. Write for illustrated bulletin and prices.

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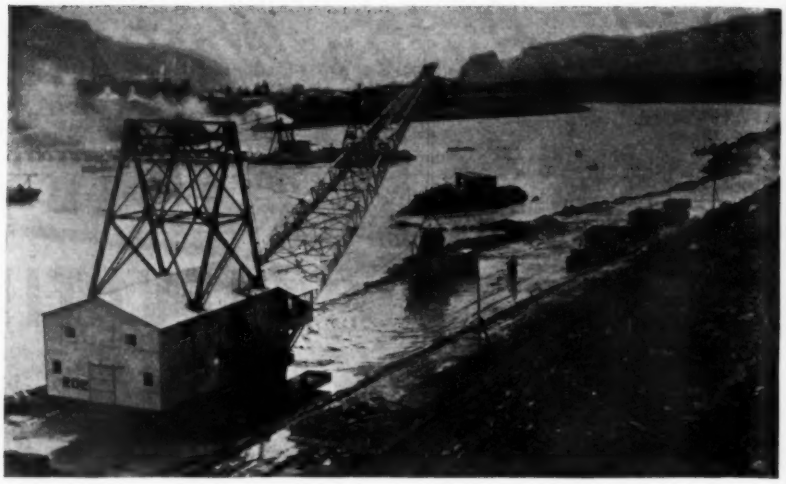

yards of material moved in one day is obtained.

It was estimated that on September 15 the great dam contained 18,591,000 yards of rock, gravel, and earth fill. These materials were divided as follows: 2,118,417 yards of toe gravel; 157,508 yards of rock; and 16,315,100 yards of earth fill.

Montana Notes

The State Highway Commission recently announced the following awards: **Thos. Staunton**, Great Falls, concrete and steel bridge including approaches, Toole County, for $74,976; **Inland Construction Company**, Omaha, Nebraska, 53.1 miles of grading and surfacing in Garfield County for $94,562, and 6.6 miles of grading and surfacing in Custer and Fallon Counties for $111,659; **McNutt Bros.**, Eugene, Oregon, 10.5 miles of grading and surfacing in Broadwater & Meagher Counties for $101,696, and 8.4 miles of grading and surfacing in Fallon County for $75,337; **S. Birch & Sons Construction Company**, Great Falls, 16.1 miles of grading and surfacing in Glacier County for $104,076; **E. A. Studer & Sons**, Excelsior, 12.1 miles of grading and surfacing in Judith Basin County for $114,625; and **Poston Brothers**, Kalispell, 5.3 miles of grading and surfacing in Flathead County, for $86,364.

Bonneville Dam Notes

The Columbia River reached its peak flood stage in July, and since that time has fallen at such a rate that the **Columbia Construction Company** was able to resume operations on the main spillway dam about the middle of August. At the peak of the flood, the top of the crib cofferdam on the south bank was twelve feet under water with the current reaching a velocity of nearly 15 miles per hour. By August 4, the water had dropped until the top of the cofferdam was exposed. Pumping operations were started to dewater the area. The cribs were found to be in excellent shape with only slight deflections from their original positions before the flood. After the stopping of leaks, dewatering is progressing satisfactorily. Columbia's Bucyrus-Monighan 6160 electric dragline, shown above, has been excavating the lower lock approach canal loading the spoil to Le Tourneau buggies. After the cofferdam area is completely dewatered, a comparatively small amount of excavation in the bottom remains to be done. Following this, concrete operations will be carried on at full speed so that the south half of the spillway dam can be built up to elevation—8 feet during this working season.

MANGANAL

For WELDING and RESURFACING BROKEN and WORN DOWN 11 to 14% MANGANESE STEEL PARTS

Trade Mark Reg. U. S. Patent Office
11-13½% Nickel Manganese Steel
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WELDING ELECTRODES
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(FOR REPAIRING SHOVEL TEETH)
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For SURFACING CARBON and ALLOY STEEL PARTS WITH LAYERS OF TOUGH, DURABLE, WEAR RESISTING MANGANAL WELDING

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PROFIT? OR LOSS?

Shovel Drives often hold the ANSWER

This Bucyrus-Erie #75-B Electric Shovel is operated by Hill and Suender near Frackville, Pa. Powered by Westinghouse.

●A penalty job . . . dates to be met *on time* or contract clauses will start eating into profits. That's the kind of a job where it pays to own *Westinghouse-powered* shovels.

Westinghouse shovel equipment is not only geared for speedy digging, it is also built to withstand that pace—yard after yard, day after day.

From the improved power plant right down to the crowd motor on the boom, every item has been applied with an engineering background based on first-hand knowledge of operating conditions. *It is built to stand the gaff on tough jobs.*

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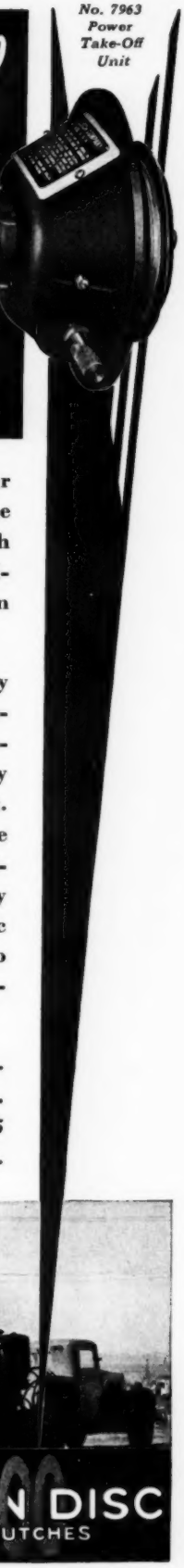
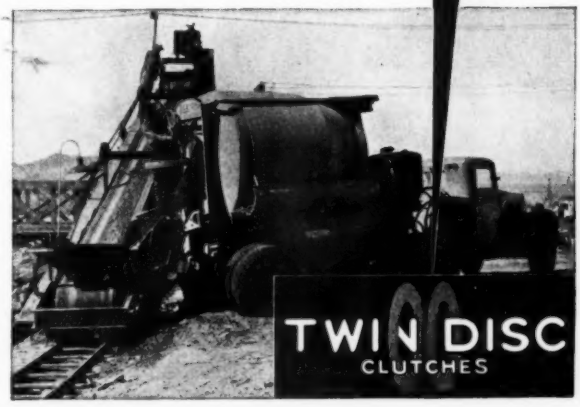


Here is one of a battery of four Rex Moto-Mixers at work on the Colorado Aqueduct—an open ditch which will carry water from Boulder Dam 242 miles into Southern California.

Twin Disc Clutches are selected by Chain Belt Company for its Moto-Mixers, Moto Agitators, and Automotive Road Pumps "because they are a good standardized unit. Economies in production have been effected because of this standardization. We have been very much satisfied with the Twin Disc Clutch and have experienced no serious trouble due to any breakdown of that part".

Write for specific recommendations. Engineering data on request. ***Twin Disc Clutch Company, 1335 Racine Street, Racine, Wisconsin.***



Shots From the Firing Line—
Continued

California Notes
By H. L. LIVINGSTON

The following contracts have been awarded by the U. S. Bureau of Public Roads:

Fredrickson & Watson and Fredrickson Bros., Oakland, $144,792 for 13.32 miles of bituminous treated crushed rock base on Generals Highway, Sequoia National Park in Tulare County.

M. J. B. Construction Co., Stockton, $72,733 for 7.2 miles of crushed gravel base course on the Pine Crest National Forest Highway, Tuolumne County.

Guy F. Atkinson Company, San Francisco, $228,471 for 4.10 miles of grading in the Los Angeles National Forest, Los Angeles County.

The U. S. Bureau of Reclamation has awarded a contract in the amount of $1,482,651 to the **W. E. Callahan Company** of Dallas, Texas, and **Gunther & Shirley**, Los Angeles, for constructing the Alcova Dam near Casper, Wyoming. This dam is to be of the earth and rock-fill type 235 feet high with a crest length of 900 feet and a crest width of 40 feet.

The U. S. Bureau of Reclamation has awarded a contract in the amount of $156,091 to **J. A. Terteling & Son**, Boise, Idaho, on Schedule 1, and to the **Utah Construction Company** and **Morrison-Knudsen Company**, Ogden, Utah, for $197,429 on Schedule 2 for constructing the earth work, canal lining, and structures on the Ogden-Brigham Canal.

The Los Angeles County Board of Supervisors is obtaining a right of way for the construction of a reinforced concrete **flood control channel** 1½ miles long in the Montrose District. The estimated cost of this work is $235,000.

The Bureau of Reclamation has been allocated **$4,500,000 for improvements** to the Salt River Valley project near Phoenix, Arizona. Work will be started immediately on the construction of the Bartlett Dam and the installation of spillways at the Roosevelt, Horse Mesa and Mormon Flat Dams.

These snapshots were taken on the **J. F. Shea Company, Inc.**, job west of the San Jacinto Mountains. This Company holds a contract for schedules 18 and 19, and jointly with Griffith Company have a contract on Schedule 20. The illustration above shows **Shea** Company's Bucyrus-Erie 52-B Diesel-powered dragline working on an open cut section. Output up to 2,000 yards per each eight-hour shift has been obtained. To give us an idea how big a 3-yard bucket really is, the boys persuaded the burro to pose with them in the bucket. We have reading from left to right: one boy, not named; one burro, also not named; Andy Karl, oiler; and Byron Welton, operator.

Colorado River Aqueduct Notes
By K. CAMPBELL

Construction of Cajalco Dam, which will create the terminal reservoir at the west end of the Aqueduct, is now under way by the **Griffith Company** who were awarded the contract for the job at a bid price of $4,646,856, covering actual construction work, but not including the cost of materials, engineering work or other items to be furnished by the District. The dam is to be completed by October 31, 1938. It was designed under the direction of Assistant Chief Engineer Julian Hinds of the District and will be approximately a half mile long and 185 feet high, of rolled earth-fill construction. The reservoir formed by it will have a capacity of approximately 100,000 acre feet of water, and will be 3½ miles long and 1½ miles wide. A dike will be built across the low rim on the north side of the Cajalco basin, located some ten miles south of Riverside. The moving of approximately 7,000,000 cu. yds. of material will be involved in the construction of the dam and reservoir. This lake will serve as a storage basin for the water brought from the Colorado River and from it distribution systems will carry the water to the 13 member cities of the District.

KEEP your machines at WORK!

BECO Blocks and BECO Linings take hold with a smooth, firm accurate grip that means greater output for the machine and more confidence for the operator. Built for hard usage and long life on the most gruelling kind of excavator work, these blocks and linings not only perform better but last longer on the job. Durable and tough, they eliminate frequent replacements or adjustments, and . . . *keep your machines at work!* Let BECO Blocks and BECO Linings prove their economy to YOU—send for a trial order today.

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Designed for use wherever heavy lifts have to be made quickly and surely. Built in three boom lengths—20, 30 and 40 feet. Capacities vary from a lift of 5 tons with 20-foot boom and 20 HP tractor to a lift of 12 tons with a 75 HP tractor. Operated and controlled by a Le TOURNEAU Two-Drum Power Control Unit. Easily connected and disconnected — no sub-frame to detach — simply remove draw bar pin.

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Made to haul 20 tons, plus capacity of truck to which it is attached. Width overall 100 inches. Length overall 212 inches. Bed dimensions 96" x 144". Weight 7,920 pounds. Sturdily built and mounted on sixteen 8¼ x 20 pneumatic tires. Double-oscillating beams keep the trailer bed level and force each tire to carry its full share of the load regardless of road inequalities. Easy rolling and easy to spot.

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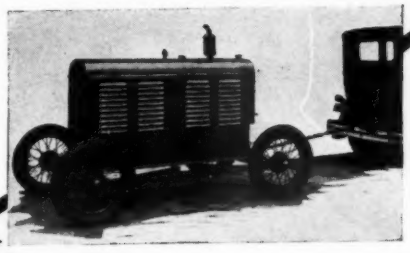

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Shots From the Firing Line— *Continued*

Illustrated here is the method used by the Griffith Company in pouring concrete on their section of the Aqueduct in the Lakeview section. Batch trucks bring the aggregate to the mixer on the bank which in turn discharges to a swinging belt conveyor. The conveyor drops the mixed concrete to a movable hopper on top of the arch form. Beyond the end of the poured section of conduit, two draglines are excavating the trenches for a length of double barreled siphon. Mount San Jacinto forms the background for this setting.

Southern California Notes

By K. CAMPBELL

General Superintendent H. J. King of **L. E. Dixon, Bent Brothers and Johnson** announced recently that if no unforeseen difficulties are encountered during the construction of the North Figueroa Street tunnel No. 4 in Los Angeles, the job will be finished by the end of this year. Two drifts have been bored through the entire length of the 755-foot tunnel. At the center, miners excavate the tunnel to its full diameter of 45 feet. An electric haulage system, operating through the drifts, carries away the spoil from the tunnel heading and also brings in the steel for the arch supports which are placed as the excavation progresses.

Los Angeles City and County were provisionally granted $51,230,980 of Federal work relief money to be spent on port, water, and building projects. Part of the money—$13,963,636—is to go for harbor improvement; three marine passenger and general cargo main channel terminals to cost $1,603,983 each; a capital ship graving dock, $4,701,362 and a marine cargo terminal, $869,055. A portion of the grant—$14,400,000—will be used to carry on the water program: $5,125,000 will go to the Mono Basin project; $1,500,000 to the Long Valley Dam; and $1,519,900 for major distribution lines.

RED Arch dragline buckets are built for fast handling and long life. You'll find them quick filling, clear dumping, correctly balanced. The lip is extra strong. The rigid arch holds its shape through hard service. Special steels, annealed and heat-treated, give exactly the right hardness and tensile strength. Excess weight is eliminated. Replacement of fittings, when needed after long service, can be quickly made.

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Not in the Contract

Vera: "What color dress will you wear to the ball?"

Cleo: "We're supposed to wear something to match our boy friend's hair—so I'll wear black. What will you wear?"

Vera: "Oh, I don't think I'll go. My boy friend is bald."

Visitor at Zoo: "Is that gnu very vicious?"

Guide: "Well, lady, no gnus is good gnus."

A recent article mentions that a good poker player can successfully run any business. But what does a good poker player want with a business?

First Kangaroo: "Annabelle, where's the baby?"

Second Kangaroo: "My goodness! I've had my pocket picked."

There are two kinds of men: those who do what their wives tell them and those who never marry.

Two spinsters were discussing men: "Which would you desire most in your husband—brains, wealth, or appearance?" asked one.

"Appearance," snapped the other, "and the sooner the better."

"Why did Noah take two of each kind of animal into the ark?"

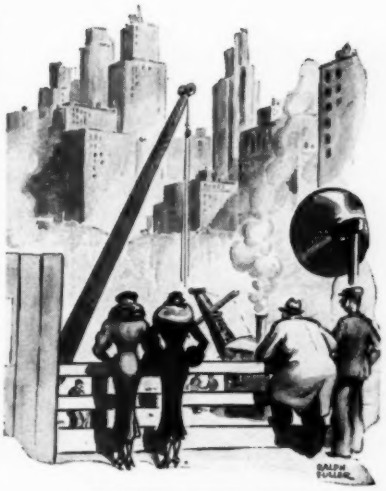
"I guess he didn't believe the story about the stork."

"Did you summer at the seashore?" inquired the man with the tan. "No," replied the red-faced citizen, "I simmered in the city."

Foreman (to workman): "Now then, Bill, what about carrying up some more bricks?"

Bill: "I ain't feelin' well, boss; I'm trembling all over."

Foreman: "Well, get busy with the sieve, then."



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"Yeah, Mabel, he says he can do better work if he knows I'm here."

Visitor: "Does the giraffe get a sore throat when he gets wet feet?"

Attendant: "Yes, sir, but not until the following week."

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Digging Through Indiana's Hills

• *Rock and nothing but rock. The 3½-B tops off the load with a big one.*

(*Continued from page 468*)

of cement was dumped into cement boxes mounted on the batch trucks.

The hauling of the aggregate from the batching plant to the mixer was done by a fleet of 1½-ton trucks each holding two batches. These trucks were hired, each being individually owned, and were of Ford, Chevrolet, Dodge, and Diamond T make.

The concrete was mixed and placed by a 27E Rex paver, made by the Chain Belt Company, Milwaukee, Wisconsin. Nine-inch Metaforms, a product of the Metal Forms Corporation of Milwaukee, were used for the edges of the pavement and for rails on which to run the subgrading and finishing equipment.

The subgrade between the forms was prepared with a Lakewood subgrader and an Austin Pup roller powered with a Model A Ford motor which the contractor had adapted to the roller in the company shop. The slight irregularities in the subgrade were smoothed off by a planer placed ahead of the paver and pushed by it. A scratch template, placed near the mixer, gave the operator a check on the grade as the paver moved ahead.

Concrete from the mixer was spread over the subgrade in a four-inch layer and smoothed by a "strike-off" attached to the paver. Wire mesh was then placed on top of this layer of concrete. Then another layer of concrete of sufficient thickness to bring the top of the slab to the required height was added.

Every 40 lineal feet of pavement is separated by either expansion or contraction joints which were alternated. Two types of expansion joints were required, one for crowned pavement and another for flat pavement.

Best Output Obtained with Paver Working on Shoulders

It was found that the best output of the paver could be obtained when the machine was set outside the forms. This was only possible where the shoulders were of sufficient width. With this arrangement, the planer, scratch template, and the strike-off were fastened together and pulled by a Caterpillar 20 operating inside the forms. The best day's production was 1227 feet of 22-foot pavement in 12 hours.

A Lakewood finishing machine with an adjustable crown screed was used to strike off the concrete and to do the preliminary finishing. This was followed by a 14-foot bull float which was worked across the concrete smoothing it down for the finishers who used 10-foot floats and straight edges to complete the operation. The final operation was to apply a broom finish to the surface. As soon as the concrete had set up sufficiently so that it would not mark easily burlap was placed over the completed pavement. The burlap was kept wet until the concrete had set sufficiently to permit men to walk on it, then the burlap was taken up and the forms removed.

The pavement was then checked with a 10-foot straight edge and any bump of ¼ inch or more in 10 feet was rubbed down with a carborundum brick. After this was done, a heavy layer of straw was placed over the pavement and wetted down. The straw was kept wet for three days, and remained on the pavement for seven days. At the end of that time the straw was removed and the pavement opened to traffic. All of the 22-foot slab was completed by August 10.

The building of shoulders, now in progress, is done chiefly by hand methods. A tractor and grader do the rough shaping, teams drawing slip scrapers are used on the short end hauling of dirt while trucks are used for the longer hauls. This work is practically completed.

One section of the work was turned out in quick time. Special permission was given by the State Highway Department to

• *Operator John Hare and the one-yard Northwest shovel handled a large share of the common excavation.*

the contractor to close off the north section for three weeks and detour the traffic around it. The detour was established on June 28, and on July 19, three weeks later, the north section was reopened after the following work had been done: 13,000 yards of common excavation, handled by the Bucyrus-Erie 34-B shovel loading to the tractor wagons; and 5,700 lineal feet of 22-foot slab, poured between July 3 and July 12. The pavement was allowed to stand for seven days and on July 19 the detour was removed.

The contract also included paving 1800 feet of State Road 54 just outside of Oolitic on a grade which has been prepared in 1934 under a separate contract. The paving on this job was completed August 19, and the shoulders have been finished since.

In accordance with the labor regulations prevailing on this type of project which was financed with Federal funds, the workmen were limited to 30 hours a week. The contractor worked the men in two shifts of six hours each, changing off at noon, five days a week.

The Calumet Paving Company, of which William Sykes of Gary is President, was represented at Bedford by George Verplank, the General Manager of the Company; Abe Verplank, Superintendent; Glen Verplank, Assistant Superintendent; and George F. Verplank, Office Manager. Abe and George F. are nephews of General Manager George Verplank, and Glen is his son. The Company was established in 1928, and at first occupied themselves with city paving and resurfacing jobs in Gary, Indiana. Later the company entered the state highway construction field and has carried numerous jobs to a successful completion. At the close of the 1934 paving season, the company had completed 47 miles of grading, 52 miles of paving, and 3 bridge contracts. Another bridge contract was completed early in 1935.

The State Highway Commission of Indiana was represented by: W. J. Heard, Resident Engineer; A. E. Livingston, Assistant Resident Engineer; W. B. McGinnis, grading and paving Inspector; T. W. Hamlin, paving Inspector; and J. F. Colby, batching plant Inspector.

• *Operator Dick Neese and Oiler Dale Adams see to it that the Bucyrus-Erie 34-B shovel turns out a good day's work.*

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want the best
ORDER wire rope for your excavator or blast hole drill from Bucyrus-Erie! You'll get uniform high quality rope, selected with the greatest care, and proved the most satisfactory for use on your machine.
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SHOVEL OPERATOR

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DRAGLINE-SHOVEL-CLAMSHELL OPERATOR

18 years' experience on general excavating construction and coal mining desires position as shovel or dragline operator. Capable of operating all types and sizes of machines. Best acquainted with Bucyrus 50-B, 30-B, D-2, 225-B steam; Northwest draglines; P&H 206, 600, 400; Lima 101, 404, 601; and Monighan 2-T, 3-T. Can do own repair work and can take charge of equipment if desired. Was superintendent four years for one company. Can furnish good references. Age 34, married. Have operated floating dredges but prefer shovel or dragline work. Available immediately. Will go anywhere for right price and reliable company. Present location, Indiana. Box 7403.

EXPERT DRAGLINE AND SHOVEL OPERATOR

16 years' experience as shovel operator. Married, 36 years of age. Have operated practically all makes of machines, and have 10 years' experience as dragline operator. Can handle steam, Diesel, electric or gasoline machine. Have worked on highway and railroad grading, rock excavation in quarry, drainage and irrigation and dredging and also gold dredging. Prefer position on Bucyrus-Erie E-2, D-2, or 50-B or other Bucyrus-Erie machines. Have also operated Class 220 and 225 electric and Diesel electric machines. Capable of taking charge of repairing and erecting and can handle crews. Best of references and can do own repairing. At present located in California, but will go anywhere. Box 5507.

OPERATOR

15 years' experience on Erie, Keystone and Osgood gas machines. Can do own repair work. Willing to go anywhere in U. S. A. Box 7200.

SHOVEL OPERATOR

Five years' experience on Bucyrus-Erie Gas+Air on basement excavation, highway and street grading. Also eight years experience on Erie, Marion, Bucyrus steam shovels. Will go anywhere. Can do own repairing. A-1 reference. Sober and reliable. Present location Minnesota. Box 7501.

EXPERIENCED DRAGLINE-CLAMSHELL-SHOVEL OPERATOR

Experienced operator desires work anywhere. Has had 15 years' on dragline work, 4 years' operating clamshell machine and 2 years' on a shovel. Experienced on railroad grading, sand and gravel, and general excavating construction work, principally operating steam machine, but has had three years' operating electric, 2 years' on gasoline and 1 year on Gas+Air machine. Prefers large Bucyrus-Erie any type; steam or electric power. Can furnish best of references from former employers. Age 40. At present located in Western New York. Box 7301.

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Shovel Equipment

½ CU. YD. DIPPER, 16' boom, 13'8" dipper handle. Shovel equipment suitable for type "A" shovel. NEW. SE-30.

⅝ CU. YD. DIPPER, 12'6" dipper handle, 16' boom. Shovel equipment suitable for type "A" shovel. NEW. SE-31.

¾ CU. YD. DIPPER—23' BOOM—12'6" DIPPER HANDLE—Shovel Equipment suitable for 20-B Gas or Diesel. NEW. SE-15.

¾ CU. YD. DIPPER 25'9" BOOM—14' DIPPER HANDLE—Shovel Equipment suitable for 30-B Diesel. NEW. SE-17.

⅞ CU. YD. DIPPER—20'6" BOOM, 17' DIPPER HANDLE, high lift shovel equipment suitable for 20-B steam. New SE-32.

⅞ CU. YD. DIPPER—21'9" BOOM and ENGINE — 15' DIPPER HANDLE — High Lift Shovel Equipment. Suitable for 31-B Steam. NEW. SE-18.

1 CU. YD. DIPPER—20' BOOM—15' DIPPER HANDLE — Rope Crowd Shovel Equipment. suitable for Osgood "Conqueror." Good mechanical condition. Low Price. SE-24.

1 1 CU. YD. DIPPER—26' boom, 17' handle Shovel equipment—Will fit 30-B. SE-35.

1¼ CU. YD. DIPPER — 25' BOOM—17' DIPPER HANDLE — Slightly Used Rope Crowd High Lift Shovel Equipment suitable for Model 37-B. **New Machine Guarantee.** SE-5.

1½ CU. YD. DIPPER—27' BOOM——17' DIPPER HANDLE—High Lift Rope Crowd Shovel Equipment suitable only for Bucyrus-Erie 43-B machines. **Rebuilt—New Machine Guarantee.** SE-23.

1 1¾ CU. YD. DIPPER, 30' boom, 19' handle, high lift shovel equipment—Will fit 50-B. New. SE-33.

1 1¾ CU. YD. DIPPER, 22' boom, 16' handle, shovel equipment—Will fit 43-B. New. SE-34.

Skimmer Scoop

⅝ CU. YD. DIPPER—20' Boom together with all necessary ropes and material to completely convert Bucyrus-Erie 1020 Shovel, Clamshell or Dragline to Skimmer Scoop Machine. NEW. Shipment 2 to 3 weeks. SS-1.

Dragline Equipment

35' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2—20-B—31-B. NEW. DL-2.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2—20-B—31-B. NEW. DL-3.

BRAND NEW Ropes included with each of above Dragline Equipments.

Trench Digging Equipment

1 CU. YD. 42½" WIDE—Solid type Dipper—24' Boom and all auxiliary equipment. Will dig maximum depth 22'. For application to GA-2 or GA-3 Shovel. **Rebuilt—New Machine Guarantee.** DS-5.

BRAND NEW PAGE, two dippers each ⅞ cu. yd., one 38" wide over cutters, the other 49½" wide over cutters. 17'1½" Boom and all necessary auxiliary equipment. Will fit Bucyrus-Erie 1030 or 1035. DS-7.

1-CU. YD. 42½" WIDE SOLID TYPE DIPPER—24' Boom and all auxiliary equipment—will dig maximum depth of 22'—For application to GA-2 or GA-3 Clam Shell or Drag Line. **Rebuilt—New Machine Guarantee.** DS-8.

BRAND NEW Ropes included with each of above Trench Digging Equipments.

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1 7'6" 1030 TUNNEL—Complete. New. H-1.
1 7'10½" 20-B TUNNEL (two sticks). New. H-2.
1 9'0" 31-B TUNNEL (two sticks). New. H-3.
3 9'0" 30-B TUNNEL (two sticks each). New. H-4.
1 9'6" 20-B TUNNEL (two sticks). New. H-5.
1 9'6" 31-B TUNNEL (two sticks). New. H-6.
1 12 0" 18-B—Complete. New. H-7.
1 12'6" D-2, 31-B—Complete. New. H-8.
1 12'6" D-2, 31-B—Complete. New. H-9.
1 13'0" 1020—Complete. New. H-10.
3 13'0" 1030—Complete. New. H-11.
1 15'0" 20-B OIL (two sticks). New. H-12.
3 15'0" E-2, 41-B—Complete. New. H-13.
1 15'0" 43-B—Complete. New. H-15.
1 16'0" TYPE "A"—Complete. New. H-16.
2 16'0"—43-B—Complete. New. H-17.
1 17'0"—TYPE "A"—Complete. New. H-18.
1 17'0"—20-B HIGH LIFT—Complete. New. H-19.
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1 17'0"—37-B—Complete. Used. H-21.
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1 17'0"—50-B OIL (two sticks). New. H-23.
1 19'0"—50-B (two sticks). New. H-24.
1 19'6"—37-B—Complete. New. H-25.

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1—24' D-2 DRAG SHOVEL BOOM—New. JA-1.
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1—18' 31-B STEAM SHOVEL BOOM—New. JA-3.
2—20'6" 20-B STEAM SHOVEL BOOM—New. JA-4.
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1—22'6" GA-2 or GA-3 SHOVEL BOOM—New. JA-6.
3—23' 20-B DIESEL, GAS OR ELECTRIC SHOVEL BOOM—New. JA-7.
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1—25'9" 30-B DIESEL SHOVEL BOOM—New. JA-10.
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1—26' 30-B STEAM SHOVEL BOOM—New. JA-12.
2—26' D-2 SHOVEL BOOM—New. JA-13.
1—26' D-2 SHOVEL BOOM—Used. JA-14.
1—26' 50-B STEAM SHOVEL BOOM—New. JA-15
3—27' 43-B ROPE CROWD SHOVEL BOOM—New. JA-16.
1—30' 50-B ELECTRIC SHOVEL BOOM—New. JA-17.
3—30' 50-B STEAM SHOVEL BOOM—New. JA-18.
1—35' D-2 DRAGLINE BOOM—New. JA-19.
1—40' 20-B, 31-B and D-2 DRAGLINE BOOM—Used. JA-20.
1—40' 30-B and E-2 DRAGLINE BOOM—Used. JA-21.
1—45' 30-B, E-2, 41-B and 42-B DRAGLINE BOOM—New. JA-22.

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3 ½ CU. YD.—Plate Front—Will fit 1020 Drag Shovel. New. D-45.

2 ⅝ CU. YD.—Plate Front—Will fit 20-B. New. D-12.

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2 ¾ CU. YD.—Rock Type—Will fit 20-B. New. D-15.

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1 ⅞ CU. YD.—Ins. Tooth—Will fit 1030. New. D-47.

2 1 CU. YD.—Ins. Tooth—Will fit 1030. New. D-48.

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1 1 CU. YD.—Rock Type—Will fit 1030 Tunnel Shovel. New. D-50.

2 1¼ CU. YD.—Ins. Tooth—Will fit 30-B, 41-B, 42-B, E-2. New D-44.

1 1¼ CU. YD—Cast Front—Will fit 30-B, 41-B, 42-B, E-2. Used. D-43.

1 1¼ CU. YD.—Rock Type—Will fit 30-B, 41-B, 42-B, E-2. Used. D-27.

1 1¼ CU. YD. — Ins. Tooth — Will fit 37-B. New. D-51.

1 1¼ CU. YD. — Ins. Tooth — Will fit 37-B. Used. D-52.

1 1¼ CU. YD. — Ins. Tooth — Will fit 37-B. Used. D-38.

2 1½ CU. YD.—Ins. Tooth—Will fit 42-B, 43-B. New. D-55.

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4 1¾ CU. YD.—Ins. Tooth—Will fit 43-B. New. D-58.

1 ⅝ CU. YD. ROCK—Will fit 20-B. New. D-64.

1 1 CU. YD. PLATE FRONT—Will fit 30-B, 41-B, 42-B, E-2. New. D-65.

1 1 CU. YD. CAST FRONT—Will fit 30-B. New. D-66.

1 1¾ CU. YD. ROCK—Will fit 50-B. New. D-67.

1 2 CU. YD.—Will fit 50-B. New. D-68.

Large Machines

1 2 CU. YD.—Manganese—Will fit 43-B. New. D-62.

1 2¼ CU. YD.—Plate Coal—Van Clark Teeth—Will fit 50-B. New. D-63.

2 3 CU. YD.—2½" Molybdenum cast steel front, two part Van Port reversible teeth—Will fit 100-B, 68-C, 70-C. New. D-2.

1 3½ CU. YD.—2¾" nickel chrome steel front, two part Van Port reversible teeth—Will fit 88-C, 95-C, Class 80 Atlantic. New. D-3.

1 4 CU. YD.—2¾" Molybdenum cast steel front, two part reversible teeth. In good condition.—Will fit 100-C, 120-B. Used. D-4.

2 6 CU. YD.—Molybdenum steel front. Annealed cast steel back, two-part Reversible Van Port Teeth.—Will fit 200-B, 225-B and 320-B. New. D-11.

1 8 CU. YD.—Front Molybdenum steel, two part Van Port Reversible teeth. Slightly used but excellent condition.—Will fit 320-B. Used. D-6.

DRAGLINE BUCKETS

5 ¾ CU. YD.—BECO TYPE "X". 2200 lbs. New. DB-21.

1 1½ CU. YD.—BECO TYPE "X". 4200 lbs. New. DB-22.

1 1¾ CU. YD.—OMAHA—STD. 3550 lbs. Rebuilt. DB-7.

3 2 CU. YD.—PAGE CLASS "C". 5630 lbs. New. DB-4.

1 2 CU. YD.—BECO TYPE "U". 3650 lbs. Rebuilt. DB-12.

4 2 CU. YD.—BECO TYPE "U". 3650 lbs. New. DB-30.

1 2 CU. YD.—BECO TYPE "X". 5300 lbs. New. DB-23.

2 2 CU. YD.—BECO HEAVY DUTY. 5400 lbs. New. DB-24.

3 2¼ CU. YD.—BECO TYPE "U". 3850 lbs New. DB-13.

4 2½ CU. YD.—BECO TYPE "U". 4100 lbs. New. DB-14.

1 2½ CU. YD.—BECO HEAVY DUTY. 6500 lbs. Rebuilt. DB-9.

1 2½ CU. YD.—BECO TYPE "X". 6800 lbs. New. DB-25.

1 2½ CU. YD.—OMAHA—STD. 5400 lbs. Rebuilt. DB-10.

1 4 CU. YD. BECO HEAVY DUTY. 11000 lbs New. DB-27.

1 5 CU. YD.—BECO HEAVY DUTY. 12700 lbs. New. DB-28.

1 5 CU. YD.—MONIGHAN HEAVY DUTY. 12000 lbs. New. DB-16.

1 6 CU. YD.—MONIGHAN TYPE "W". 12500 lbs. New. DB-17.

1 6 CU. YD.—BECO TYPE "X". 14400 lbs New. DB-29.

1 7 CU. YD.—MONIGHAN TYPE "W". 13700 lbs. New. DB-18

ELECTRICAL EQUIPMENT

90 H.P. MOTOR—GENERAL ELECTRIC—3 phase, 25 cycle, 550 volt, 1509 RPM. NEW EE-1.

50 KW MOTOR GENERATOR SET—GENERAL ELECTRIC—consisting of 75 H.P. induction motor, 3 phase, 60 cycle, 440 volt, connected to 50 KW, 250 volt—1200 RPM Generator, includes suitable rheostat and compensator. NEW. EE-2.

75 H.P. COMPENSATOR—GENERAL ELECTRIC—2200 volt, 3 phase, 25 cycle, manual type. NEW. EE-3.

5 KVA TRANSFORMER—GENERAL ELECTRIC—2200-3810 volt primary, 440-220 volt secondary—3 phase, 60 cycle, with cast iron tank and cover, including specially fastened bushings to prevent oil leakage. NEW. EE-4.

125 KW GENERATOR—WESTINGHOUSE—250 volts, 500 amperes, Direct current. 440 RPM. Includes two outboard bearings. NEW. EE-5.

LOCOMOTIVES

3 24-INCH GAUGE 3-TON BALDWIN GASOLINE LOCOMOTIVES, Model AL, Type 2. Price very favorable. L-1.

PUMPS

1 NB—3 STAGE CENTRIFUGAL PUMP—2" suction and discharge—bronze impeller and shaft—capacity 100 gallons per minute at 240' head operating at 1720 RPM or 270' head at 1780 RPM. Now equipped for belt drive but can be operated by 15 HP Electric Motor. ME-6.

ENGINES

Designed especially for application to Excavating or similar Equipment. Can be used for stationary or semi-stationary service.

Diesel

2—140 H.P. NEW, NON-REVERSIBLE ATLAS DIESEL ENGINES—5 cylinder, 9" bore x 10½" stroke, 514 R.P.M., 4 cycle, vertical overhead valves, dust proof, oil tight crank case and forced lubrication. Includes auxiliary air starting equipment. DE-2.

1—45 H.P. NEW, NON-REVERSIBLE ATLAS DIESEL ENGINE—4 cylinder, 6" bore x 8" stroke, 650 R.P.M., 4 cycle, vertical, overhead valves and forced lubrication. DE-5.

3—110 H.P., NEW, NON-REVERSIBLE ATLAS DIESEL ENGINES—6 cylinder, 7" bore x 8½" stroke, 600 R.P.M., 4 cycle, vertical, overhead valves and forced lubrication. DE-6.

Steam

1 12½"x16" link reversing type for Railroad Shovel. ME-1.

2 4½"x5" reversible—20.8 H.P. at 400 R.P.M. 100 lb. Pressure. ME-2.

1 4⅜"x5" reversible—23.2 H.P. at 400 R.P.M. 100 lb. Pressure. ME-3.

1 5"x5" reversible—25.6 H.P. at 400 R.P.M. 100 lb. Pressure. ME-4.

BOILERS

NEW

Will Make That Old Shovel Work Like New.

Can also be used for Miscellaneous Service

Vertical Type

2 46½"x110"—40 H.P.—155 lb. Working Pressure. Special Wood Burning Fire Box. ASME Std. Will fit any B-2 or B-3. B-9.

Locomotive Type

3 44'x17'—75 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 68-C. B-13.

1 44"x18'—88 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 70-C. B-14.

1—70"x12'—136 H.P. 175 lb. working pressure. ASME. and Mass. Std. Will fit 120-B. B-18.

AIR COMPRESSORS

1 BRAND NEW WORTHINGTON—METAL-WELD—2-cylinder 7"x6" Vertical 162 cu. ft. piston displacement, Air Compressor. Fitted with Laidlaw feather valves—Lugs on side for mounting on skids or channels—Shaft extended and equipped with semi-flexible coupling to take 2⅝" drive shaft—Force feed lubrication. Automatic control. Includes 1" High capacity centrifugal circulating pump—"V" belt driven—18"x41" Air Receiver, 100 pounds working pressure. A.S.M.E. Standard. Electric or gasoline power required approximately 30 H.P., approximately 1000 R.P.M.—Compressor Speed approximately 550 R.P.M.—Overall dimensions: Height 45"—length 37½"—width 28". AC-3.

2 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with with fittings. NEW. AC-1.

1 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Used. Make offer. AC-2.

Florida Ship Canal Bids Opened Oct. 7

BIDS WERE OPENED October 7 at the U. S. Engineer's office, Ocala, Florida, for the construction of 15 miles of the Florida Cross State Canal (this issue was on the press before the results of the bidding were known). The letting involved 18,500,000 yards of dry excavation, sand and shell, divided into 29 items, between Silver Springs and Dunnellon.

The construction of such a canal across Florida has been advocated for many years. It has a history extending back to the days of Spanish ownership in 1600. Later, surveys for a route were made by the French Government. The U. S. Government again made surveys in 1830 but the project was considered too costly to carry out.

With the advent of Federal Aid in the form of Federal relief funds, the project was again brought up and, this time, a definite start has been made. The President recently approved an allotment of $5,000,000 with which to begin construction on the largest earth moving project within the United States and which is estimated will cost $146,000,000 to complete.

The yardage involved on the 195-mile-long canal will exceed that moved on the Panama Canal by almost 2½ times. The Florida Canal will require 570,000,000 yards of excavation while the Panama Canal had 240,000,000 yards. The U. S. Engineers estimate that of the 570,000,000 yards to be moved, 150,000,000 yards will be dry digging, and 420,000,000 yards will be handled by floating dredges.

The canal route follows natural waterways for about one-half its length. From the Atlantic on the east, the canal will follow the Saint Johns River from its mouth near Jacksonville, southwest to Palatka, then west to Port Inglis on the Gulf of Mexico.

FOR SALE

RATES:	First insertion rate per column inch	Repeat insertions (no change in copy) rate per column inch
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Over 3 and up to 7 inches	4.25	3.75
Over 7 inches	4.00	3.50

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Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards

LIMA MODEL 101—Combination 1¼ yard shovel and 40' plus 10' extension Dragline—powered with gasoline engine Model JK 6½" x7"—4 cylinder. Shovel equipment practically new. Located Colorado. Box 599-SS.

MARION TYPE 32 STEAMER, Shop No. 5676, 18' boom, 15' dipper handle, 1¼-cu. yd. dipper shipped May, 1926, good operating condition. Box 451-SS.

BUCYRUS-ERIE 35-B ELECTRIC 24' BOOM, 16' Dipper Handle, 1½ cu. yd. Dipper, 3 phase, 25 cycle, 440 volt, Cat mounted. Box 544-SS.

BUCYRUS-ERIE 43-B GASOLINE CHAIN CROWD SHOVEL — 23' boom — 17' dipper handle —1½ cubic yard Vanderhoef dipper and teeth—electric starter—standard single shaft cat. Operated less than six months. Excellent appearance and condition. Will be demonstrated by owner. Located vicinity New York. No. 512-SS.

LORAIN—75-A—One and one-quarter cubic yard Gasoline Shovel. Good condition. Located Chicago. Box 676-SS.

LORAIN—MODEL 60—One cubic yard Gasoline Shovel. Good condition. Located Chicago. Box 677-SS.

BUCYRUS-ERIE LATE MODEL B-2 STEAM HIGH LIFT SHOVEL. 1 yard dipper—single shaft cat mounting. Good condition. Located near St. Louis. Box 518-SS.

MARION MODEL 450—1¼ Cu. Yd. Steam Shovel, Cat Mounted. New Gears on Caterpillar recently installed. Price favorable. 516-SS.

NORTHWEST MODEL 105 SHOVEL. Bargain Price. Located Texas. Box No. 566-SS.

NORTHWEST NO. 4—24' Boom, 16' Dipper Handle, 1 yard Dipper—Gasoline—Located eastern New York. Good condition. Box 600-SS.

TYPE B BUCYRUS-ERIE HIGH LIFT STEAM SHOVEL. 21'3" Boom, 18'4" Dipper Handle, ¾ cubic yard inserted Tooth Dipper—Power Boom Hoist—Boiler Feed Pump—Caterpillar Mounted. Located Chicago. Box 699-SS.

B-2 BUCYRUS-ERIE HIGH LIFT STEAM SHOVEL. 24' Boom—18'4" Dipper Handle—¾ yard Inserted Tooth Dipper—Boom Hoist—Caterpillar Mounted—Good operating condition. Located Chicago. Box 700-SS.

20-B BUCYRUS-ERIE COMBINATION STEAM SHOVEL - CLAMSHELL - DRAGLINE. Good working condition. Caterpillar Mounted. Located near Peoria, Illinois. Box 701-SS.

GA-2 BUCYRUS-ERIE HIGH LIFT SHOVEL. 24' Boom—18'4" Dipper Handle, 1 cubic yard Inserted Tooth Dipper. Also includes Forward Drum and Gearing and mechanism for clamshell operation including 45' boom. Also 1 cubic yard Williams clamshell bucket. Waukesha WL Engine. Good operating condition. Located Chicago. Box 702-SS.

BUCYRUS-ERIE GA-2—Gas-Air Combination High Lift Shovel and 50' Boom Dragline Equipment, mounted on Single Shaft Cat. Good operating condition. Located at Shawnee, Okla. 537-SS.

BUCYRUS-ERIE MODEL B-2 High Lift Steam Shovel. Caterpillar mounted. Good working condition. Located northern New Jersey. Price very reasonable. Box 643-SS.

BUCYRUS-ERIE MODEL B-2 High Lift Steam Shovel. Caterpillar mounted. Very good working condition. Located South Carolina. Box 644-SS.

GA-2 SHOVEL, BUCYRUS-ERIE NO. 9918, 22' Boom, 16' Dipper handle, 1 cu. yd. manganese steel front inserted tooth dipper, 20-10 Gas Air single shaft drive, caterpillar mounted, 6¼x8", 4 cyl. Waukesha Motor. Weight 71,900 lbs. Reconditioned. Located Greensboro, N. C. Price $5000.00. Box 595-SS.

BUCYRUS ERIE GA-2 Gas-Air High Lift Shovel—24' Boom, 16' Dipper Handle, 1¼ cu. yd. Dipper, Single Shaft Cat, Electric Starter. Waukesha 4-cylinder 6¼"x8" Gasoline Engine. Reported excellent condition. Located West Virginia. 593-SS.

THEW LORAIN MODEL 75 SHOVEL. 24' Boom, 18' dipper handle, 1¼ cubic yard dipper. Gasoline. Machine now operating. Located central New York State. Box 665-SS.

BUCYRUS-ERIE TYPE B STEAM COMBINATION SHOVEL-CLAMSHELL AND STEAM HOE. Machine completely rebuilt 1929. Good operating condition. Located near Boston. Box 517-SS.

GENERAL ½ cubic yard Gasoline Shovel—including 30' Boom Clamshell and Dragline Equipment—New 1931—powered with Buda DW6 High Altitude Gasoline Engine. Excellent condition. Located near Denver. Box 588-SS.

BYERS MASTER SHOVEL — 26' Boom, 17' Dipper Handle, 1¼ cu. yd. Dipper, New January 1931. Good working condition. Located Melvern, Kansas — Highway 75 south of Topeka. Price very favorable. 591-SS.

BUCYRUS-ERIE GA-2 Gas-Air Extra High Lift Shovel—24' Boom, 18'4" Dipper Handle, 1¼ cu. yd. Dipper, Single Shaft Cat. Electric Starter. Excellent condition. Located eastern Pennsylvania. 592-SS.

BUCYRUS-ERIE—42-B Steam Shovel. Caterpillar Mounted, 21' Boom, 15' Dipper Handle, 1½ Cubic Yard Dipper, Power Boom Hoist. This machine excellent mechanical condition. Located Birmingham, Alabama. Can be demonstrated. Box 531-SS.

TYPE "B" CAT. MOUNTED, equipped with 19'6" boom, 16' dipper stick and ¾ yard dipper, in good working order. Located near Hudson, Pennsylvania. Price $1750.00. Box 493-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL: 21' boom, 15' dipper handle, boom hoist, dipper trip, 1¼ cu. yd. Vanderhoef dipper, cat mounting, now located and can be demonstrated at Colchester, Conn. Very favorable price. Box No. 532-SS.

BYERS BEAR CAT—⅝ yd. Gasoline Shovel—Recently overhauled — Located Birmingham, Alabama. Box 480-SS.

P & H MODEL 600—1 yd. Gasoline Shovel—including 40' boom dragline equipment without bucket. Waukesha Engine. Recently overhauled. Located in Alabama. Box 483-SS.

1 BUCYRUS-ERIE B-2 Steam ⅞ yard High Lift Shovel—Cat Mounted. Good operating condition. Located near Boston. Make offer. Box 521-SS.

BUCYRUS-ERIE 42-B STEAM SHOVEL—late model, 21' boom, 15' dipper handle, 1½ cu. yd. Vanderhoef dipper, boom hoist, dipper trip. Massachusetts standard boiler, cat mounting. Good operating condition. Now located and can be demonstrated at Colchester, Conn. Box No. 533-SS.

BUCYRUS-ERIE GA-2 Gas-Air High Lift Shovel. 24' Boom, 18'4" Dipper Handle, 1 cubic yard Dipper. Single shaft cat. Waukesha four cylinder gasoline engine. Excellent operating condition. Located North of Chicago. Box 645-SS.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

BUCYRUS-ERIE GAS+AIR—22′ Boom, 16′ Dipper Handle, 1¼ cubic yard Dipper, Waukesha 6¼″x8″ four cylinder gasoline engine. Single Shaft Cat mounted. First class condition. Located eastern New York.
Box 601-SS.

BUCYRUS-ERIE Steam Combination Shovel and Clamshell Machine. Single shaft cat mounted. ¾ cubic yard Williams Clamshell Bucket included. Excellent mechanical condition. Located Virginia. Box 672-SS.

BUCYRUS-ERIE GAS-AIR TYPE GA-2 HIGH LIFT SHOVEL — 22′6″ boom — 16′ dipper handle—1¼ yard cast front inserted tooth dipper—single shaft caterpillar mounting—electric starter. Excellent condition. Field reconditioned. Waukesha 4-cylinder 6¼″x8″ engine — New cylinder blocks and piston rings. Located near Scranton, Pennsylvania. Will demonstrate. Box 508-SS.

LORAIN MODEL 75 Combination 1¼ cu. yd. shovel and 50′ boom dragline. Powered by Waukesha four cylinder 7¾″ x 8″ gasoline engine. Located Eastern Pennsylvania.
Box 693-SS.

LIMA MODEL 101—1¼ yard Shovel, Waukesha type WL Gasoline Engine. Very favorable price. Located Kansas City, Missouri.
Box 598-SS.

If You Do Not Find What You Want Listed—Write Us

Excavating Engineer
South Milwaukee, Wisconsin

BROWNHOIST MODEL NO. 2 ½ cu. yd. rope crowd gasoline shovel or clamshell. Waukesha four cylinder engine in good operating condition. Bargain price. Located near Peoria, Illinois. Box 689-SS.

BYERS-BEARCAT — Combination Shovel—Pull Shovel and Lifting Crane; Half swing. Gasoline power. Excellent condition. Located Detroit, Michigan. Box 690-SS.

GENERAL COMBINATION SHOVEL-CRANE. Shovel Boom and Handle rebuilt. A-1 shape. ⅝ yard Dipper. 35′ Crane Boom. 12 New Cat Tread Links. Cat mounting and general condition machine—good. Located Georgia. Price very reasonable. Box 578-SS.

BUCYRUS-ERIE — DIESEL-AIR — COMBINATION SHOVEL AND DRAGLINE. 22′6″ Boom—16′ Dipper Handle—1¼ cubic yard Inserted Tooth Dipper. 45′ Boom Complete Dragline Equipment without bucket. Engine—Atlas Diesel. Located Oklahoma. Good operating condition. Box 703-SS.

BAY CITY MODEL S—1¼ cubic yard Gasoline Shovel. Located near Boston. Box 705-SS.

MEAD MORRISON—⅝ **CUBIC YARD GASOLINE SHOVEL.** Good operating condition. Located near Boston. Box 706-SS.

2—TYPE GA-2 BUCYRUS-ERIE COMBINATION SHOVEL AND CRANES.
1—NORTHWEST 105 COMBINATION SHOVEL AND CRANE. Bargain prices. Located at Wilkes-Barre, Pa.
Box 712-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL—21′ Boom, 15′ Dipper Handle, 1¼ cu. yd. Dipper, Power Boom Hoist, Cat mounted. Located New York City. Box 545-SS.

TWO (2) MODEL 301 STANDARD KOEHRING MACHINES good operating condition. Now operating and can be inspected in southwestern Ohio. Price, $3,000.00 each.
Box 540-SS.

BUCYRUS-ERIE B-2 EXTRA HIGH LIFT STEAM SHOVEL. 21′3″ Boom, 16′ Dipper Handle, 1 cubic yard cast front inserted tooth Dipper. Single Shaft Cat. Fair operating condition. Boiler very good. Located New York. Box 715-SS.

BUCYRUS-ERIE B-2 HIGH LIFT STEAM SHOVEL. 19′9″ Boom, 16′ Dipper Handle, ⅞ cubic yard inserted tooth Dipper. Two speed propelling gear. Located Boston.
Box 716-SS.

BUCYRUS-ERIE EXTRA HIGH LIFT STEAM SHOVEL. 21′3″ Boom, 16′ Dipper Handle, ⅞ cubic yard inserted tooth Dipper. Single Shaft Cat. Located Boston. Box 717-SS.

BUCYRUS-ERIE GA-2 COMBINATION SHOVEL AND DRAGLINE. 22′6″ Shovel Boom, 16′ Dipper Handle, 1 cubic yard cast front inserted tooth Dipper. 50′ Dragline Boom including Fair leads but not Bucket. Air Starter. Good condition. Located Newark.
Box 718-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL. 21′ Boom, 15′ Dipper Handle, 1¼ cubic yard Dipper. First class operating condition. Located New York. Box 719-SS.

LORAIN 75-B COMBINATION SHOVEL AND DRAGLINE. 1¼ cubic yard Shovel Equipment. 50′ Dragline Boom, without bucket. Waukesha 6¾″x8″ four cylinder gasoline engine. Excellent condition. Located eastern Pennsylvania. Box 720-SS.

TWO LORAIN 75-B COMBINATION 1½ CUBIC YARD SHOVEL AND 50′ BOOM DRAGLINES — without buckets. Gasoline power. Good working condition. Located eastern Pennsylvania. Box 721-SS.

LORAIN 75-B 1½ CUBIC YARD SHOVEL. Gasoline power. Good working condition. Located eastern Pennsylvania. Box 722-SS.

MARION MODEL 21 ELECTRIC—M.G. SET ¾ YARD SHOVEL. Good condition. Located eastern Pennsylvania. Box 725-SS.

P&H MODEL 700 COMBINATION 1¼ CUBIC YARD SHOVEL AND 50′ BOOM DRAGLINE WITHOUT BUCKET. Gasoline power. Good working condition. Located eastern Pennsylvania. Box 729-SS.

P&H MODEL 300 SHOVEL—18′ Boom, 15′ Dipper Handle, ⅝ cubic yard Dipper, manganese front. Powered with Waukesha B U 4½″x6¼″ engine, power clutch control. First class operating condition. Located Massachusetts.
Box 663-SS.

P&H MODEL 600—1¼ CUBIC YARD GASOLINE SHOVEL. Will be put in good operating condition. Located eastern Pennsylvania. Box 664-SS.

FOR SALE CHEAP

Marion Model 440 Gas Shovel and Dragline, 1 cubic yard capacity. For sale cheap. Located Missouri. Box 634-SS

GA-2 HIGH LIFT SHOVEL—24′ boom, 16′ dipper handle, 1¼ cubic yard dipper, on single shaft cat. Electric starter, Waukesha 4-cylinder 6¼″x8″ gasoline engine. Reported excellent condition. Located Virginia.
Box 623-SS

TWO 1030 single motor ELECTRIC SHOVELS. 12′10″ boom, 10′6″ dipper handle, 1 yard rock dipper: also 40′ boom crane equipment, 7′6″ rear end clearance. Electric power supply 3 phase, 60 cycle, 440 volt. Located Philadelphia. Very good condition. Box 626-SS

Make an Offer

2 MARION SHOVELS

—Model 480 Electric, Combination shovel and dragline. 70′ boom and Type X Bucket,—2 cubic yard capacity. Shovel dipper 2 cubic yard. Good condition.

—Model 480 Electric Dragline. 70′ boom, 2 yard X bucket. Good condition.

Box 698-SS

2 INSLEY ⅝ YARD GASOLINE SHOVELS. Located eastern New York State. Bargain prices. Box 574-SS.

OSGOOD MODEL 18 Steam—¾ yard shovel—Cat mounted. Just completely overhauled. Excellent condition. Located near Indianapolis, Ind. Box 522-SS.

MARION 1 YARD STEAM SHOVEL
Box 575-SS.

⅝ YARD SHOVEL
Universal ⅝ yard gasoline shovel—¾ swing. Good operating condition. Located Northern Michigan.
Box 636-SS

B-2 STEAM SHOVEL, CAT MOUNTED. 19′9″ boom, 16′ dipper handle, 1 cubic yard dipper. Good running condition. Located, Minnesota.
Box 621-SS.

TYPE B STEAM SHOVEL, Cat mounted, 19′6″ boom, 14′ dipper handle, ¾ cubic yard dipper, also 36′ clamshell boom and front drum and gearing. Located Kansas City, Missouri.
Box 622-SS

If You Do Not Find What You Want Listed—Write Us

Excavating Engineer
South Milwaukee, Wisconsin

BUCYRUS-ERIE GA-2 Gas-Air—Extra high lift 24′ boom—18′ 4″ dipper handle, 1 cu. yd. dipper. Single shaft cat mounting—air starter. Good condition. Located near Hartford, Conn. Box 523-SS.

1—Type B Bucyrus-Erie Combination High Lift Shovel and 40′ Clamshell Machine.
1—Type B Bucyrus-Erie High Lift Shovel.
2—Type B-2 Bucyrus-Erie High Lift Shovels.
All located western Connecticut. Operating condition. Entire lot very low price. Box 573-SS.

KOEHRING MODEL 601 SHOVEL. Cat mounted. 24′ boom, 18′ dipper handle, 1½ cubic yard manganese front dipper. 20″ Cat treads. Wisconsin 6-cylinder Model E, 6″x7″ gasoline engine. Located Maryland.
Box 631-SS

TWO KOEHRING MODEL 502 COMBINATION SHOVELS AND CRANES. Each equipped 21′ boom, 16′ dipper handle, 1¼ cubic yard dipper, 50′ crane boom with 10′ removable insert. Kohler light plant driven by 4-cylinder gasoline engine. Excellent condition. Only handled one job. Shovel equipment has seen very little service. Located Philadelphia. Box 632-SS.

LIMA 101 GASOLINE 1¼ YARD SHOVEL. Located eastern Pennsylvania. Good operating condition. Price reasonable. Box 576-SS.

P&H—MODEL 600—Combination 1 yard shovel and 40′ boom dragline including dragline bucket. Waukesha gasoline engine. Machine in fair operating condition. Located Georgia.
Box 695-SS.

UNIVERSAL—MODEL NO. 35—½ cu. yd. shovel and 28′ boom clamshell including ½ cu. yd. Owens clamshell bucket. Powered by Waukesha four cylinder 4½″ x 6¼″ gasoline engine. Engine completely overhauled this year. Entire machine put in first class shape. Excellent condition. Located North Carolina.
Box 696-SS.

NORTHWEST MODEL 105—1 YARD GASOLINE SHOVEL. Fair running order. Located Georgia. Bargain price. Box 579-SS.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards
Continued

TYPE "R" INSLEY SHOVEL ½ yard capacity—full revolving. Cat mounted. New 6-cyl. Waukesha motor. 45 HP. First class mechanical condition. Ready to go to work. Very favorable price. Located Milwaukee. Box 629-SS

E-2 DIESEL SHOVEL—26' boom, 15' dipper handles, 1½-yard dipper. Atlas Diesel Engine. Located Massachusetts. Box 616-SS

P&H MODEL 700—1½ cubic yard shovel. Powered with Waukesha 150 h.p. Ricardo head 7¼"x8" gasoline engine. Good operating condition. Located New Mexico. Box 652-SS.

43-B GAS SHOVEL—22' boom, 16' dipper handle, 1¾ yard inserted-tooth dipper. Electric starter. Wisconsin 6 cylinder 6x7" engine. Reconditioned—first class condition. Located, New York. Box 617-SS

Small Draglines
Under 2 Yards

20-B BUCYRUS-ERIE COMBINATION STEAM DRAGLINE - CLAMSHELL - SHOVEL. Good working condition. Caterpillar Mounted. Located near Peoria, Illinois. Box 701-SD.

BUCYRUS-ERIE GA-2 COMBINATION DRAGLINE AND SHOVEL. 50' Dragline Boom including Fairlead but not Bucket. 22'6" Shovel Boom, 16' Dipper Handle, 1 cubic yard cast front inserted tooth Dipper. Air Starter. Good condition. Located Newark. Box 718-SD.

LORAIN 75-B COMBINATION DRAGLINE AND SHOVEL. 50' Dragline Boom without Bucket. 1¼ cubic yard Shovel Equipment. Waukesha 6¾x8" four cylinder gasoline engine. Excellent condition. Located eastern Pennsylvania. Box 720-SD.

2 LORAIN 75-B COMBINATION DRAGLINES AND SHOVELS. 50' dragline booms without buckets. 1½ cubic yard shovel equipment. Gasoline power. Good working condition. Located eastern Pennsylvania. Box 721-SD.

LINK-BELT MODEL K-44 45' BOOM PLUS TWO 10' AND ONE 5' EXTENSIONS—TOTAL 70' DRAGLINE WITHOUT BUCKET. Gasoline power. Includes 800 Watt Kohler Light Plant. Located near Chicago. Good operating condition. Box 723-SD.

LINK-BELT 1 CUBIC YARD CAPACITY 50' BOOM DRAGLINE WITHOUT BUCKET. Gasoline power. Reported good operating condition. Located near Chicago. Box 724-SD.

TWO NORTHWEST MODEL 104—45' BOOM—1 YARD CAPACITY DRAGLINES. Gasoline power. Located Chicago. Box 726-SD.

OSGOOD 40' BOOM—1 YARD CAPACITY—DRAGLINE. Page one yard Drag Bucket. Hercules Model YXC-2 4½"x4¾" gasoline engine. Fair operating condition. Located Minneapolis. Box 727-SD.

P&H MODEL 700—50' BOOM DRAGLINE WITHOUT BUCKET. Gasoline power. Good operating condition. Located eastern Pennsylvania. Box 728-SD.

P&H COMBINATION DRAGLINE AND SHOVEL. 50' dragline boom without bucket. 1¼ cubic yard shovel equipment. Gasoline power. Good working condition. Located eastern Pennsylvania. Box 729-SD.

BUCYRUS-ERIE — DIESEL-AIR — COMBINATION DRAGLINE AND SHOVEL. 22'6" Boom—16' Dipper Handle—1¼ cubic yard Inserted Tooth Dipper. 45' Boom—Complete Dragline Equipment without bucket. Engine—Atlas Diesel. Located Oklahoma. Good operating condition. Box 703-SD.

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P&H—MODEL 600—Combination 40' boom dragline and 1 yard shovel including dragline bucket. Waukesha gasoline engine. Machine in fair operating condition. Located Geor Box 695-SD.

43-B GASOLINE — BUCYRUS-ERIE — COMBINATION DRAGLINE AND CLAMSHELL—1¾ cubic yard Bucket capacity—no bucket. Good condition. Located Arizona. Box 704-SD.

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Small Clamshells and Cranes
Under 2 Yards

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Excavating Engineer
South Milwaukee, Wis.

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2 Yards and Over

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1—Back Hoe Attachment for 50-B.
Located in this district.
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50-B STEAM SHOVEL, Number 3946; equipped with 1½-cubic-yard dipper, 26-foot boom, also 1½-cubic-yard dragline bucket with 50-foot boom caterpillar mounted, equipped for burning oil, located at Texarkana, Ark. Price $3,000. Box 112-LSD.

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FOR SALE

CLASS 14 STEAM DRAGLINE with 2-yard Page bucket. Location Iowa. Very good condition. Surprisingly low price f.o.b. cars

ALSO

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Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

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LOCOMOTIVES

6 BALDWIN, 17x24, straight drive standard gauge 45 ton locomotives. 54 inch boilers. Shop numbers from 32,750 to 34,611. Each one has passed State Boiler Inspection yearly. Boilers will stand cold water test of 240 lbs. At present in actual service in Minnesota mine. Box 152-ME.

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Two 40-ton, 6-wheel switchers. Recently overhauled and rebuilt. Two 50-ton 6-wheel switchers. In excellent condition. Location Chicago. Box 306-ME.

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TWO AMERICAN STEAM LOCOMOTIVE CRANES. Each 8 wheel—25 ton capacity. Each equipped with 8¼"x10" double cylinder engine. Boom 50'. Steam brakes and train air line. Boiler 54"x101" ASME—130 pounds pressure. Standard gauge 4'x8½". Used only eight months. Splendid condition. Box 628-ME.

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ONE COMPLETE NARROW GAUGE DIRT MOVING OUTFIT including camps, shop and haulage equipment. Located near Fort Wayne, Indiana. Can you use it?

54 Steel bunks with mattresses and bedding. Mattresses and bedding are sewed up in burlap.
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50 Shovels and picks, approximate.
1 Fairbanks Morse gasoline engine and 5x5 bulldozer pump 3 HP.
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4 Track jacks, 15 ton.
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1 Duplex Pump—Worthington, 5¼x3½x5.
10 Slips.
1 Anvil.
1 Forge.
6 Switches.
4 Frogs.
10 Switch points.
2 Each, scythes, hand saws, cant hooks, spike malls.
1 Carbide light.
1 Kitchen outfit.
30 Western dump cars, 5-yard.
1 36x84" vertical boiler.
1 6" centrifugal pump with upright engine attached.
2 Galvanized water tanks, wagon size.

Will consider individual sale of separate items.

Address Box 449 ME.

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LOADMASTER—MODEL MD—Wheel type, 16' boom, starter, lights, and Ross steering gear. In service loading freight cars for 17 months. New August 1, 1933. Completely rebuilt with new engine parts, new tires, hoist clutches, etc. Guaranteed like new. Reasonably priced f. o. b. Chicago. Box 684-ME.

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Offered for sale by Southern contractor. Priced to sell.
7—Railroad Type Steam Shovels 2½ to 5 yd.
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32—12-yd. Western Heavy Duty Dump Cars.
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Pumps, Boilers, Jacks and Other Tools.
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BRAND NEW PAGE DRAG SHOVEL EQUIPMENT suitable for application to Bucyrus-Erie 1030, 1035, or 32-B machines now in the field, consisting of 17'1½" boom, 11' dipper handle, and two ¾ cubic yard dippers; one 38" wide over cutters—the other 49½" wide over cutters, together with auxiliary A frame and ropes. Priced below cost. Box 683-ME.

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2—2½ cubic yard dippers for 70C Bucyrus steam shovel. One of these dippers is in good condition and the other has not been used since being rebuilt. Has set new Westico teeth. For particulars write Foley Brothers, Inc., New York Building, St. Paul, Minn.

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1 Main Engine
1 Boom
1 Dipper Shaft
1 Crowding Engine
1 Five Yard Dipper

If interested in making a good buy on these shovel parts, write us. Box 607-ME.

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4 LA PLANT CHOATE 6-yard, all-steel, dump wagons. Equipped with wide iron wheels. Price $100.00 each. Chicago territory. Box 349-ME.

4—75 DIESEL CATERPILLAR TRACTORS.
4—EUCLID DUMP WAGONS. Located eastern Fennsylvania. Box 710-ME.

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1—10-TON DRAVO STEAM WHIRLER
2—14" CENTRIF. PUMPS, 6000 g.p.m., with Climax R-4-U gas engines
1—55-YARD, 2-COMPARTMENT HELTZEL TRAILER-TYPE BIN
1—80-YARD, 2-COMPARTMENT JOHNSON BIN, with batchers
2—24" GAUGE BROOKVILLE GAS LOCOMOTIVES
1—120-FOOT MAST ENSLEY HOIST AND ELEVATOR
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LARGE ASSORTMENT SMALL TOOLS, drills, busters, pumps, blocks, steel erection tools, etc. Located at Wilkes-Barre, Pa. Box 713-ME.

October Advertisers

American Steel and Wire Company 462
Austin Western Road Machinery Co., The 481
Bargain Counter ..... 490 and 491
Bucyrus-Armstrong ..... 4th Cover
Bucyrus-Erie Co. ..... 457, 479, 480, 482, 484, 486, and 489
Bucyrus-Monighan Company 463
Caterpillar Tractor Company ..... 2nd Cover
Ensign-Bickford Company, The 458
For Sale Advertisements ..... 492 to 495
(See also pages 490 and 491)
Gatke Corporation 487
General Electric 486
Harnischfeger Corp. 485
Hayward Company, The 486
Hercules Powder Company 477
Ingersoll-Rand Company 461
Koehring Company 460
Koenig Labor Agencies, The 486
Leschen and Sons Rope Company, A. ..... 3rd Cover
Le Tourneau, R. G. Inc. 485
National Carbon Co., Inc. 485
Positions Wanted Advertisements 489
Riddell Co., W. A. 487
Sauerman Bro., Inc. 486
Stulz-Sickles Company 482
Twin Disc Clutch Co. 483
Wellman Eng. Co., The 478
Westinghouse Electric & Mfg. Co. 483

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